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24 June 1981

# Latin America Report

## No. 2329

## ORINOCO OIL BELT: STRATEGY FOR DEVELOPMENT

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# PDVSA, SUBSIDIARIES, ENERGY MINISTRY RELATIONS DISCUSSED

Caracas NUMERO in Spanish 3 May 81 pp 16-19

[Article by Keith Grant]

[Text] Since the nationalization, the holding company's relations with its affiliates, with the ministry and with the government in general have represented an arduous process during which different styles have led to basic understandings. The critical element is the lack of a consensus between AD [Democratic Action] and COPEI [Social Christian Party] on oil policy.

Over the next 3 months the highest-level executives of Venezuelan Petroleum, Inc (PDVSA) will be subjected to review for the second time since the sector was nationalized. Major changes are not expected, however. Gen Rafael Alfonzo Ravard will get another 2-year term, and the directors will continue in their posts, with two or three exceptions.

The enterprise that is the country's biggest revenue-producer has undergone few changes in administration over the 6 years since it was created, indicating how highly men like Gen Alfonzo Ravard are thought of, as well as the deliberate intention of maintaining continuity and consistency in its operations. This process has given rise to an efficient industry that accumulated millions of bolivars in profits over its first 5 years and that set an example for the rest of Venezuela's state-run enterprises. Relations among the Energy Ministry, PDVSA and its subsidiaries have developed in excellent fashion, which recently led a number of government circles to think about the possibility of introducing a similar organization in the electricity and aluminum sectors. The most optimistic officials are even saying that the holding company could represent a panacea for deficit-ridden public enterprises.

But the debate continues. There are powerful reasons not to take the oil industry as a model for the rest of the public sector and also to think that the industry must integrate further with all representative sectors so that basic agreements can be reached.

Meanwhile, the recent attacks that AD has leveled at the parent company are sufficient reason not to assume a complacent attitude regarding the apolitical stance that the company has maintained so far.

Development of Concepts. It is interesting to compare the views upheld during the time of the nationalization with the approaches that predominate at present. The principles have, in general, remained the same, but their implementation has been affected by political factors. Perhaps the most important criterion was that PDVSA was a commercial corporation whose officials should be appointed because of their technical abilities, not their political merits. Four years ago, Alirio Parra, who is still a PDVSA director, put forth four basic characteristics that differentiated the company from other state-run enterprises:

1. PDVSA was established as a commercial enterprise and depends on its own earnings to cover investments.

2. The company is completely free of political interference thanks to its independent management system.

3. Management guidelines are economic, not political.

4. Basic competitive incentives are preserved.

In a study presented at a seminar in Canada on the topic of state-run oil enterprises, Parra also pointed out that PDVSA differs from private companies because its operations are closely linked to national policy for the sector. This is an area where the implementation has not been a complete success. Other public enterprises also maintain ties such as these, but according to Alberto Quiros Corradi, president of Maraven, there are very clear-cut reasons why the oil industry is efficient while others are not.

"It's not that we have good executives and they don't," he explained to NUMERO. "These other enterprises have very competent men but they operate under heavy bureaucratic controls that we have so far not had to put up with." Quiros Corradi also points out that in contrast to other state-run companies, the nationalized oil industry inherited a structure marked by continuity. "A consistent policy line is almost not to be found in other sectors, and their executives have always been vulnerable to changes in government. State-run enterprises also depend on the public sector for financing and have to compete with road construction and sewage systems."

The other public sectors did not, of course, have the benefit of 40 years of working experience under professional standards of the highest level. The public enterprise that most highly developed the team spirit that PDVSA has achieved was the CVG [Venezuelan Corporation of Guayana], which was founded in 1960 and whose first vice president was Gen Rafael Alfonzo Ravard. But today's CVG is just a shadow of its former self, and its influence is declining by the day vis-a-vis the strengthening of the financially powerful Venezuelan Investment Fund (FIV).

The Nationalization Stage. The nationalization decreed in January 1976, which cost Venezuela only $1 billion in compensation, has been almost unanimously viewed as a success, although the reason is not always understood. Ostensibly, the process was facilitated by the operational procedures inherited from the American companies and by the contributions of a dependable team of professionals with years of experience, backed by technical assistance from the former concessionaires. According to Quiros, however, the most important element was the cooperation achieved between ranking executives and employees, which was furthered by their mutual respect.

Before 1976, the concessionaires had competed ferociously, and since they had to answer to shareholders in the United States, efficiency became a priority objective, which left its mark on the current executives. These executives are technically competent, enjoy a high degree of training and usually speak several languages. They often include men like Quiros or Parra, who speak English fluently, and even some, like the president of INTEVEP [Venezuelan Institute of Petroleum Technology], Nelson Vazquez, who speak flawless French. The concessionaires sent their Venezuelan employees to Nigeria, Indonesia, London and New York for training. They thus developed professional staffers comparable to those in any industrialized country. The companies bolstered the team spirit by delegating responsibilities and placing a high degree of trust in the lower echelons. Promotions were based strictly on performance.

Problem-Free Transfer. Encouraged by the favorable conditions in which the transition was accomplished, PDVSA began to rationalize the industry in early 1977 by merging the 14 nationalized companies into 4 major subsidiaries. The process took 3 years, as more than 100 executives and thousands of workers were transferred without adversely affecting operations. The vice president of Meneven, Gustavo Coronel, feels that this was perhaps the nationalization's greatest accomplishment, made possible thanks to discipline.

But even with its team spirit and professionalism, the oil industry is today up against a major challenge in maintaining the coherence of its organization in light of the enormous plans for expansion that have been drawn up for the next 20 years. This coherence has so far been preserved in spite of the changes in the roles of PDVSA and the Ministry of Energy and Mines, although very few sources think that the current relationship can be a permanent one.

PDVSA and the Ministry. PDVSA's position with respect to the Ministry of Energy and Mines was not clearly defined at the outset, and to a certain degree there is still some flexibility today. At the time of the nationalization, the ministry represented a powerful element that had vigorously supervised the concessionaires in recent years but that had transferred a good portion of its functions to the new oil holding company. Partly because of the moderate style of then Minister Valentin Hernandez, the ministry did not throw the weight of its authority around as the representative of the sole PDVSA shareholder (the State), and the enterprise continued its firm application of oil policy.

According to Quiros, the problem was that PDVSA was more geared towards formulating directives than to the task of coordinating. "Prior to the nationalization, no one was concerned about the integration of the industry, because the concessionaires were competing among themselves. But with the creation of PDVSA, there arose the temptation to bureaucratize an industry in which quick decision-making is especially important." Quiros's viewpoint naturally reflects his position as president of the second most important subsidiary. As far as he is concerned, the question was not to define an approach to the organization of the industry (it had already been implicitly defined) but to implement it. Problems arise, Quiros says, when everyone wants to play the same role, when there is a clash between administrative and coordination functions.

**Learning Process Continues.** To Richard Irving, a former Shell executive and the current PDVSA planning coordinator, Venezuela had no experience as to what a holding company ought to do, and the learning process is still continuing. "In part, this has to do with the dilemma of the Third World," Irving explains. "Difficulties arise when developing countries adopt a large-scale expansion plan. They handle themselves well at the supply level but are inefficient and unsure when they shift to the supermarket level." Irving does not think, however, that PDVSA is inefficient, just that the roles of the people running the industry tend to become confused.

According to Quiros, PDVSA has shifted from its original role of administrator to the functions of planning and coordination, whereas the ministry has again taken on the technical supervision of operations. This has obviously enabled the subsidiaries to assert their identity, thus reducing policy conflicts. "It is no longer just a question of giving orders," Irving points out; "you have to make room for initiative."

**PDVSA and Its Affiliates.** The subsidiaries do, in fact, enjoy considerable freedom in their everyday operations and require prior approval only for very important decisions, such as long-term (more than 12 months) sales contracts, equipment purchases and expenditures programs. PDVSA's coordinating function is based on the liaison committees for each sphere of activity. At the moment, there are 17 of these committees, and each one of them is chaired by a PDVSA director or manager and meets once a month. The committees are the main operational link between PDVSA and the affiliates, which take part in them through their sector managers. In addition, an expanded Board of Directors meets on the first Monday of every month; it consists of the president and directors of PDVSA and the presidents of the seven affiliates. The system has yielded good results since it was created and has extended its functions to incorporate new activities, such as urban development, as the industry has branched out.

Just as relations between PDVSA and its affiliates have developed, a similar phenomenon has come about between the ministry and PDVSA. The biggest change took place in August 1979 when PDVSA's bylaws were amended to bolster the minister's role as number one authority. The terms of office of PDVSA officials were cut from 4 to 2 years, and the minister was given the responsibility of presiding over PDVSA stockholder assemblies and of approving its budgets.

**Decision-Making.** A major change thus came about in the policy-making mechanism, and its effects are still being discussed in the sector.

Criticism has been voiced to the effect that oil policy is becoming concentrated in a small group of officials and that, therefore, decision-making and policy implementation are often subject to improvisation. These objections were voiced particularly sharply early this year when the government launched the campaign for a gasoline price increase, a cause for which PDVSA has been fighting for 3 years now and that Minister Calderon Berti has been unable to lead to victory over the political opposition.

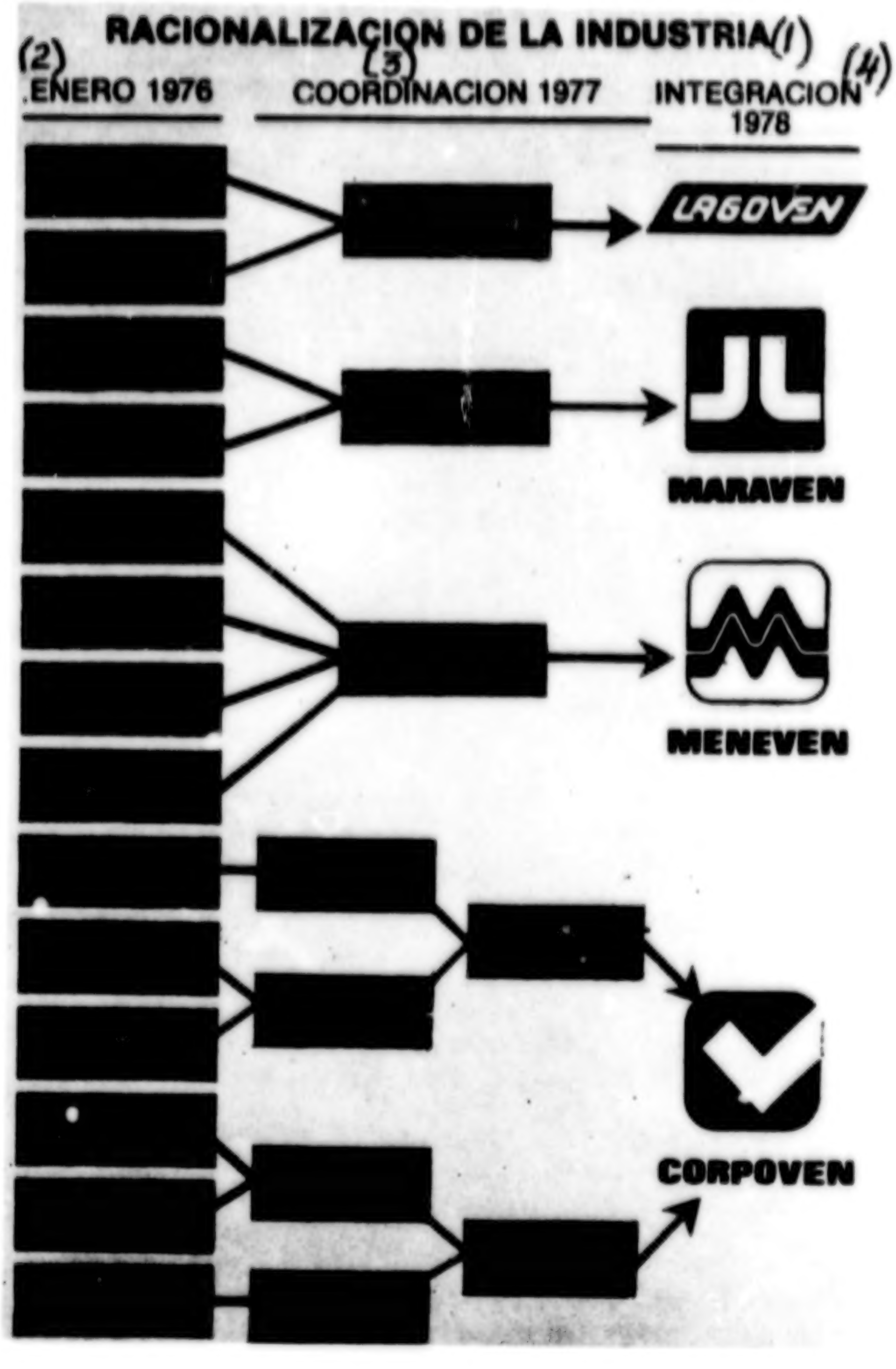
Petroleum Policy. The decision-making process and public relations have perhaps been the most deficient areas of activity since the nationalization. Although internal politicization was avoided by appointing officials based on their professional qualifications, PDVSA and its affiliates have not been able to completely avoid outside political meddling. There is a clear-cut difference of opinion with regard to public relations policy: some feel that the controversy would have arisen in any case, even if more information had been made public beforehand, while others think that the conflict could have been avoided if a more open publicity strategy had been adopted.

In general, PDVSA has tried to keep up a "sober" image, holding back from publicizing information considered harmful to its commercial interests.

National Goals. In the study that he prepared 4 years ago, Alirio Parra said that PDVSA's success depended on whether national goals were adopted as the goals of the state-run oil company. "Although this poses certain basic difficulties, it is advantageous because the achievement of these goals can be planned and can become a basic element in the enterprise's philosophy. This minimizes the risk of after-the-fact confrontations with the government and with other pressure groups that have hounded private companies in other countries." Parra clarifies that the objectives decided on must be realistic. "This means that the enterprise must cooperate actively with national-level decision-making bodies, to insure that its policies and objectives are consistent with the economic and commercial realities of industry and especially of the world market."

It is precisely this coordination of initiatives among the ministry, the party in power and the industry that has begun to show some cracks, according to certain sector observers.

Consistency in policy formulation is essential for industry planning. Irving points out that PDVSA finds itself at the very end of an at times lengthy chain of decision-making in which several ministries have input and which is subject to many political considerations. "A policy change can be decided on in 5 minutes in a ministry, but at times the industry takes 10 years to alter its course of action." Irving explains. Debate at times arises belatedly, as in the case of the Orinoco Belt, many feel, after sizable investments have already been committed. Irving feels that the debate on the belt, within the context of the nation's development priorities, would have been constructive during the initial stages because it would have confirmed PDVSA's long-term plans. But the process of adopting national goals as PDVSA's own goals, which Parra talked about 4 years ago, has not been easy.



Key:

1. Rationalization of the Industry
2. January 1976
3. Coordination 1977
4. Integration 1978

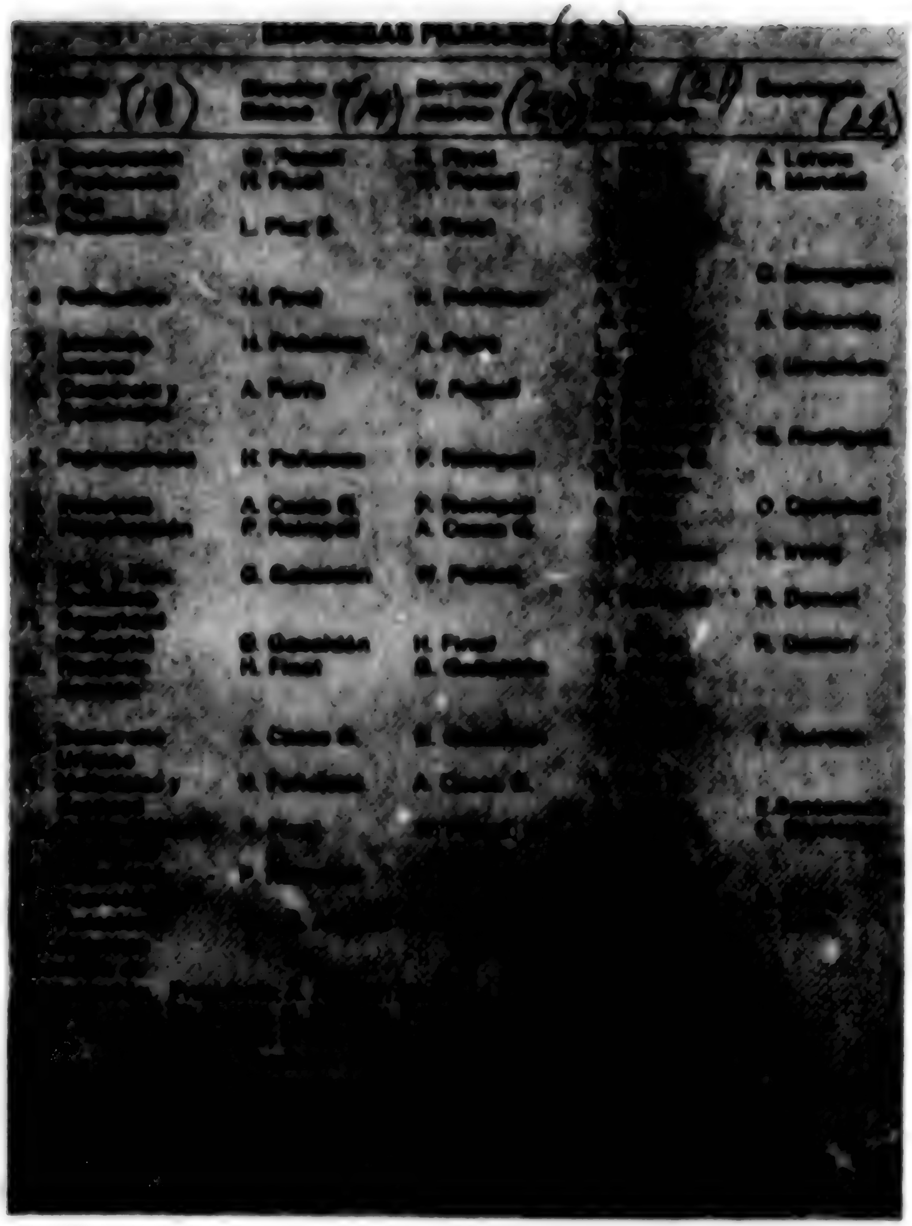
The Future. Part of the problem is obviously that the two major political parties have not achieved a consensus on national objectives, which makes it hard for PDVSA to draw up its own objectives with total certainty. The fact that AD is now questioning the government's investment plans for the 1981-1986 period (which involve 93 billion bolivars) indicates that consultations have not been successful and that the opposition party, which might take over again at the next election, is not willing to accept these major commitments automatically.

The upshot of this disagreement is that there is a risk of increased political meddling as the presidential election draws near. This has already happened with the surprising attack leveled by AD President Gonzalo Barrios at PDVSA's expenditures policy, and the industry might have to cope with drastic changes in 1983.

In the first place, there will be a new national government as well as new officials in PDVSA. General Alfonzo will leave office in August 1983, assuming that he is appointed again this year, and several men have already been mentioned as his successors. If General Alfonzo continues in his post this year, Guillermo Rodriguez Eraso, from Lagoven, has to be taken off the list because he too will have to retire at that point. The "favorites" would thus be Quiros from Maraven and Antonio Casas Gonzalez from PDVSA, although there is a chance that Calderon Berti himself might take the post.

This contingency (which for the time being is mere educated guesswork) would aggravate the policy-making problems that now plague the industry, especially if AD wins the elections. And even if COPEI were to win, a Calderon Berti running PDVSA would give the company a much higher profile than it currently has.

The feeling is that the industry is generally satisfied with the relations among the ministry, PDVSA and the affiliates and that there is little support for the alternative of a "super holding company" or a "super ministry" in which one or another of these elements would be discarded. The industry is technically efficient and capable of handling its ambitious expansion plans, but it has not yet succeeded in functioning as an independent technocracy due to the absence of a real national consensus on petroleum policy.

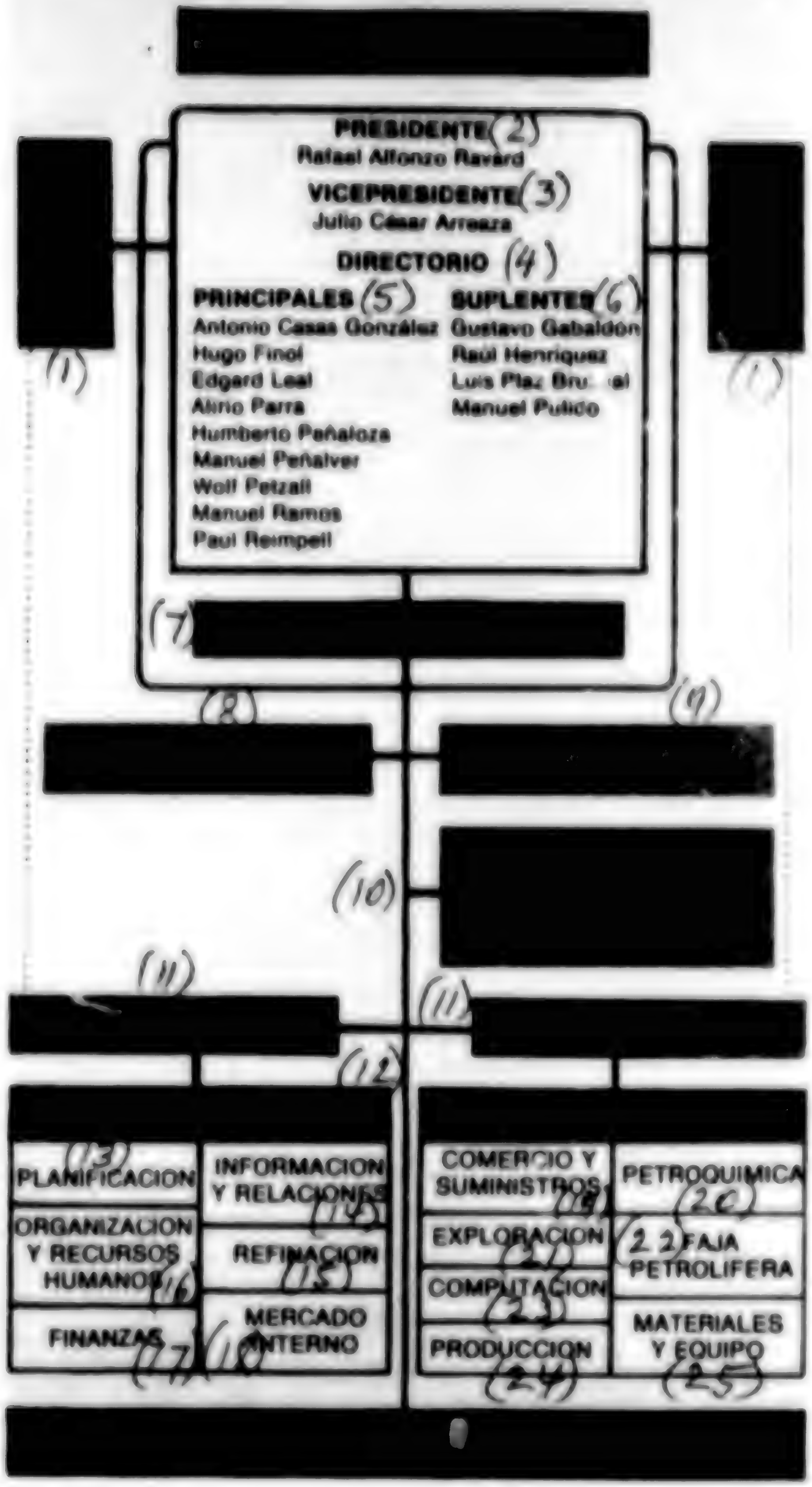


Key:

1. Exploration
2. Production
3. Oil belt
4. Refining
5. Domestic Market
6. Commerce and Supply
7. Petrochemicals
8. Finances
9. Planning

10. Organization and Human Resources
11. Industrial Safety
12. Rationalization
13. Urban Development
14. Materials and Equipment
15. Computation and Systems
16. Technological Development
17. Foreign Relations
18. Committees
19. Liaison Director
20. Alternate Director
21. Other Members
22. Secretary
23. Affiliated Enterprises
24. Hiring Committee
25. The presidents of the seven affiliates are also on it.
26. As the enterprise's legal adviser, Dr A. Aguilar is an adviser to the committees and can sit in on any of them.

# Comités del Directorio(1)



Key:

1. Committees of the Board of Directors
2. President
3. Vice President
4. Board of Directors
5. Regular members
6. Alternates
7. Executive Committee
8. Legal Adviser
9. Personal Adviser to the President
10. Executive Assistant to the President and Secretary of the Company
11. Liaison Directors
12. Coordinations
13. Planning
14. Information and Relations
15. Refining
16. Organization and Human Resources
17. Finances
18. Domestic Market
19. Commerce and Supplies
20. Petrochemicals
21. Exploration
22. Oil belt
23. Computation
24. Production
25. Materials and Equipment
26. Affiliated Enterprises

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## PDVSA REPORT ON FUTURE OIL DEMAND, PRODUCTION

Caracas RESUMEN in Spanish 3 May 81 pp 26-40

[Text] Introduction

The domestic oil industry has the following basic tasks:

a) To produce the hydrocarbons needed for economic growth, inasmuch as petroleum is the country's main source of energy.

b) To provide the government revenue that the nation requires for its domestic programs, inasmuch as the industry represents the government's major source of revenue for pursuing social development programs and infrastructure and investment projects in the fields of industry and agriculture.

c) To generate a large part of the foreign exchange that the country requires.

d) To serve as a foundation for the country's development through its programs and activities.

In light of these tasks, the industry must create a sufficiently flexible and solid production, manufacturing and marketing infrastructure to cope with the uncertainties in the price of and demand for hydrocarbons in the country and on export markets.

Manufacturing industries entail processing, and all processing consumes energy. The expansion of existing activities and the development of new industries require additional energy. The process of change in a country, call it growth or development, also requires energy, energy for transportation and communications to link the distant points of a large national territory; energy for crops and to develop natural resources, and energy to transform them into goods and services for thousands of different purposes throughout the country.

Venezuela is in the midst of a process of steady transformation and diversification, as the following indicators show:

--Population growth
--Economic growth
--Increase in energy consumption

As the process of change gathers momentum, the dimensions of the demand for energy also change. This means that we must look into the future, analyze the impact of these changes and determine the course that will enable the industry to continue fulfilling its responsibilities to the country.

The function of the Ministry of Energy and Mines is to assure the country reliable and strategically diversified sources of energy and to establish an energy policy that will enable the country to influence the future course of demand.

There is little flexibility in the short and medium term for interchanging the various existing sources of energy. The scant flexibility that we have is represented by the petroleum industry and its ability to supply larger amounts of liquid hydrocarbons products to offset the shortfalls that might arise in other sources.

The growing domestic demand for oil necessarily entails a steady decrease in our oil export capacity, with the corresponding impact on foreign exchange income, if current output levels are maintained.

The ongoing incorporation of more costly exploration, production and refining processes will have an impact on government revenue.

The country's growing energy demand makes it technically advisable to maintain suitable supply capacity and flexibility to deal with possible overestimations of the impact of energy conservation policies, errors in consumption projections, time lags in other energy development projects that are part of the national energy policy, as well as unforeseen international developments.

The Venezuelan economy is in a process of steady transformation and diversification. The economic contributions that we can expect from the nonpetroleum sectors are steadily increasing, but as we will see later on, there is no alternative in sight that can move the nation's economy forward, either in terms of our balance of payments or government revenue, without input from petroleum or with oil playing a secondary role.

All of the above reaffirms the strategic advantage of making sure that the petroleum industry achieves an output capacity consistent with the nation's future needs.

## Energy Trends

It is not easy to project or predict energy supply and demand, because demand is determined by the total requirements of the various sectors of the economy, each with its own characteristics and influenced more by social and political factors than by physical factors such as technology and logistics. With regard to supply, it depends basically on the amount and quality of resources and on prices.

The estimates of future energy demand on which PDVSA [Venezuelan Petroleum, Inc] relies to determine objectives and strategies are the result of "scenarios," each of which consists of a consistent set of economic and social circumstances stemming from our current environment.

Applying these scenarios to project energy demand is based on the generally accepted notion that energy use is closely linked to a country's economic activity, its structure and the increase in its population.

This interrelationship has been found valid not only for developed countries but also for countries with centralized economies and for developing countries like Venezuela.

In our case, we have considered two potential growth scenarios; they represent the upper and lower limits within which the country's future development and, therefore, its energy demand could unfold during the period in question. The upper limit represents a per capita rise in the gross domestic product (GDP) of about 3.7 percent, while the lower limit represents just a 0.9 percent rise.

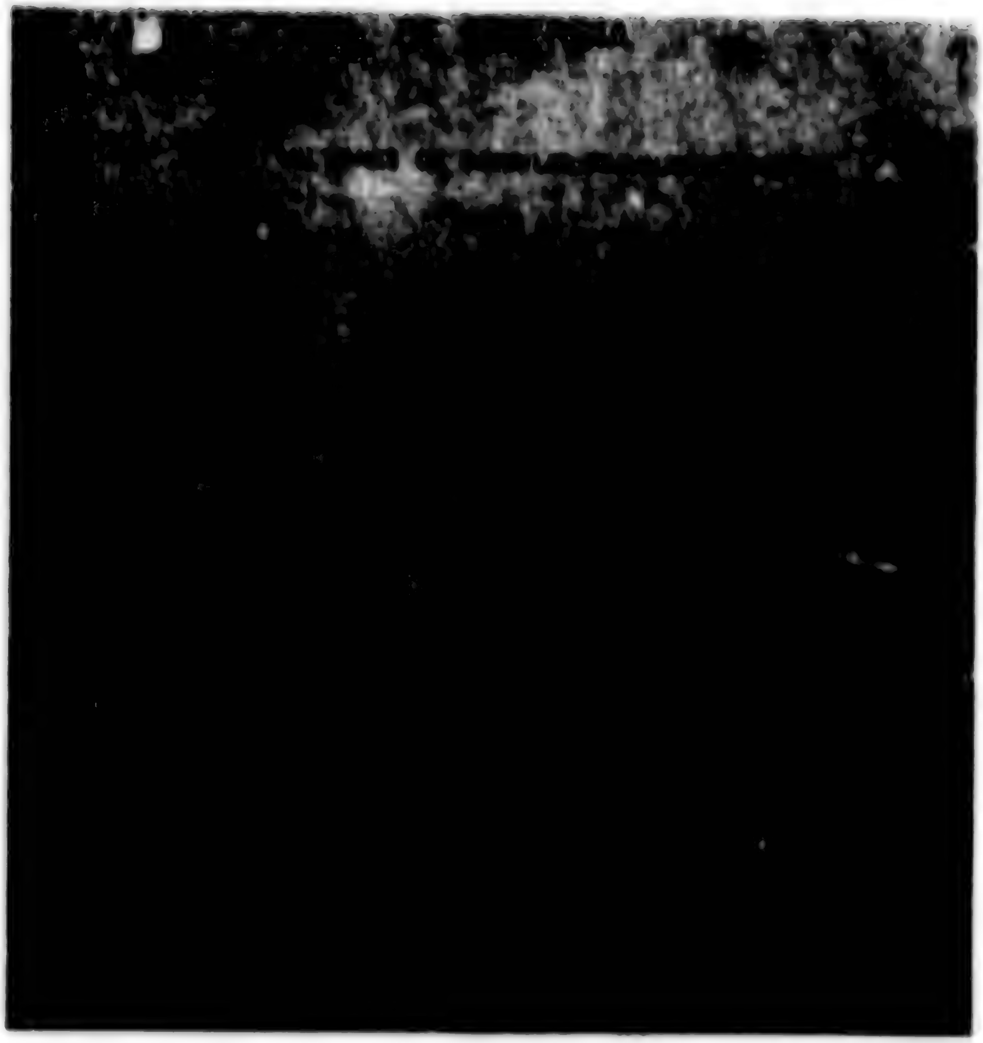
We should clarify that this methodology does not attempt to estimate one or several energy consumption figures for any particular year; rather, it seeks to establish trends and sufficiently broad ranges of magnitude so that we can assume that actual developments will fall within these limits, as long as unusual or catastrophic developments do not take place.

These estimates were obtained by qualified Venezuelan groups backed by international specialists and are based on official statistics from the Ministry of Energy and Mines (MEM), the Central Bank of Venezuela (BCV), the United Nations and others, taking into account the best programs for hydroelectric and coal utilization, a doubling of the medium- and long-term input of natural gas and an analysis of the detailed programs of our major sectors (electrical energy, sugar, cement, transportation, iron and steel, aluminum, petrochemicals and household items).

We must bear in mind that one of the hallmarks of the energy industry is that it is capital-intensive and that investments in it take a relatively long time to yield results, 8 to 10 years and more, and that therefore decisions to go ahead with such investments must be made in such a way as to diminish risks and uncertainties.

Domestic Consumption of Liquid Hydrocarbons

The additional amounts of liquid hydrocarbons that the National Petroleum Industry (IPN) has provided the domestic market as a result of time lags in other energy projects or underestimates of the growth in other domestic sectors have been supplied at the expense of its exporting capacity. With a fixed production goal, this has resulted in less foreign exchange and less government revenue to finance the national economy.



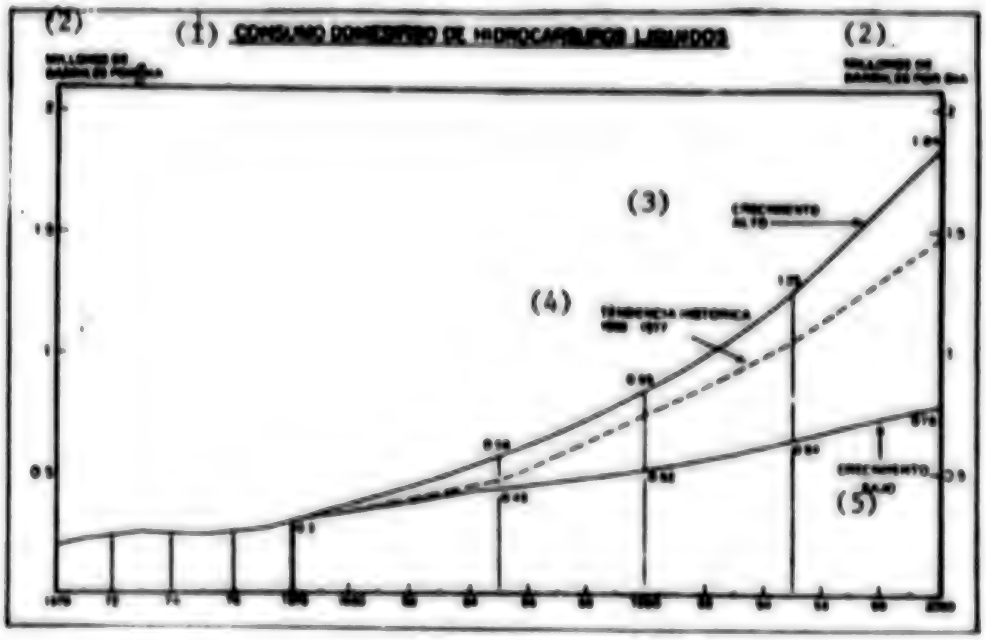
Key:

1. Total energy demand in Venezuela
2. Equivalent in millions of barrels of oil a day
3. Rapid economic growth
4. Trend
5. Slow economic growth
6. Actual
7. Source: Study by MEM, PDVSA, Maraven and Cambridge University

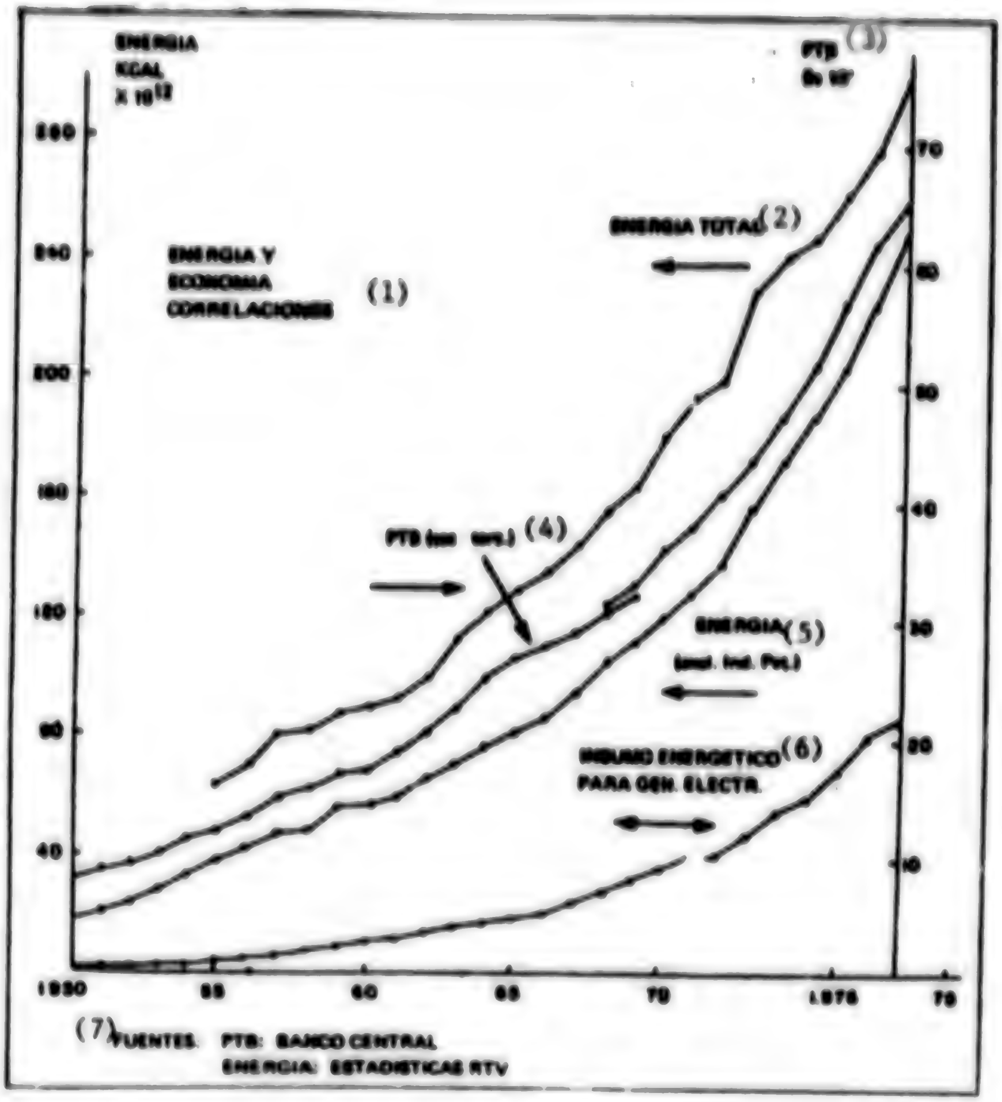
Our economy is in the midst of a process of steady transformation and diversification, and experience tells us very clearly that we will have to depend on the petroleum sector for a long time yet to meet the country's energy requirements and to fulfill its expectations for economic well-being.

When we include in our analysis the well-known programs for energy production from other sources, we should underscore that oil and its derivatives are still the most important source of supplies, even in scenarios of slow economic growth. This situation has a great deal to do with population growth, the increase in the GDP and energy consumption per unit of the GDP. The Sixth Plan of the Nation's bases for development are in line with historic trends up to now.

It is our hope that the nonpetroleum sectors of the economy gradually boost their contributions, in the form of greater foreign exchange and more government revenue, as a result of the process of national economic diversification. Until the contributions of these sectors can sustain the national economy, we must maintain and bolster the IPN's ability to provide energy for the country without cutting dangerously into its economic contributions in the form of foreign exchange and government revenue.



Key
1. Domestic consumption of liquid hydrocarbons
2. Millions of barrels a day
3. Rapid growth
4. Historic trend
5. Slow growth



Key:

1. Energy and the economy: correlations
2. Total energy
3. GDP
4. GDP (tertiary sector)
5. Energy (excluding petroleum industry)
6. Energy input to generate electricity
7. Sources: GDP: Central Bank; Energy: RTV statistics

Crude Oil Production Potential

There is a clear-cut downward trend in the production potential of traditional areas, in spite of the costly and mounting efforts to repair and drill wells and in spite of secondary and tertiary recovery projects under way.

This decline seems irreversible, even if we accept the optimistic estimates for the areas adjacent to traditional ones.

Updated figures point to a potential of 1.1 million barrels a day, within 20 years, from traditional areas and 1.3 million barrels a day if estimates for adjacent areas are included.

## Production Potential Versus Domestic Demand

The crude oil output potential of deposits in traditional areas is experiencing a steady decline of about 20 percent from year to year, in spite of the costly and mounting efforts to repair and drill wells, the development of additional recovery projects and moves to boost output from deposits of heavy crude oils. As production capacity has been declining, there have been major increases in the domestic demand for liquid hydrocarbons, light and medium crude oils in particular, as a result of the country's development process. There is an increasingly smaller amount of quality hydrocarbons available for export, which means a drop in foreign exchange and government revenue from exports, even with potential price increases stemming from OPEC's long-term strategy.

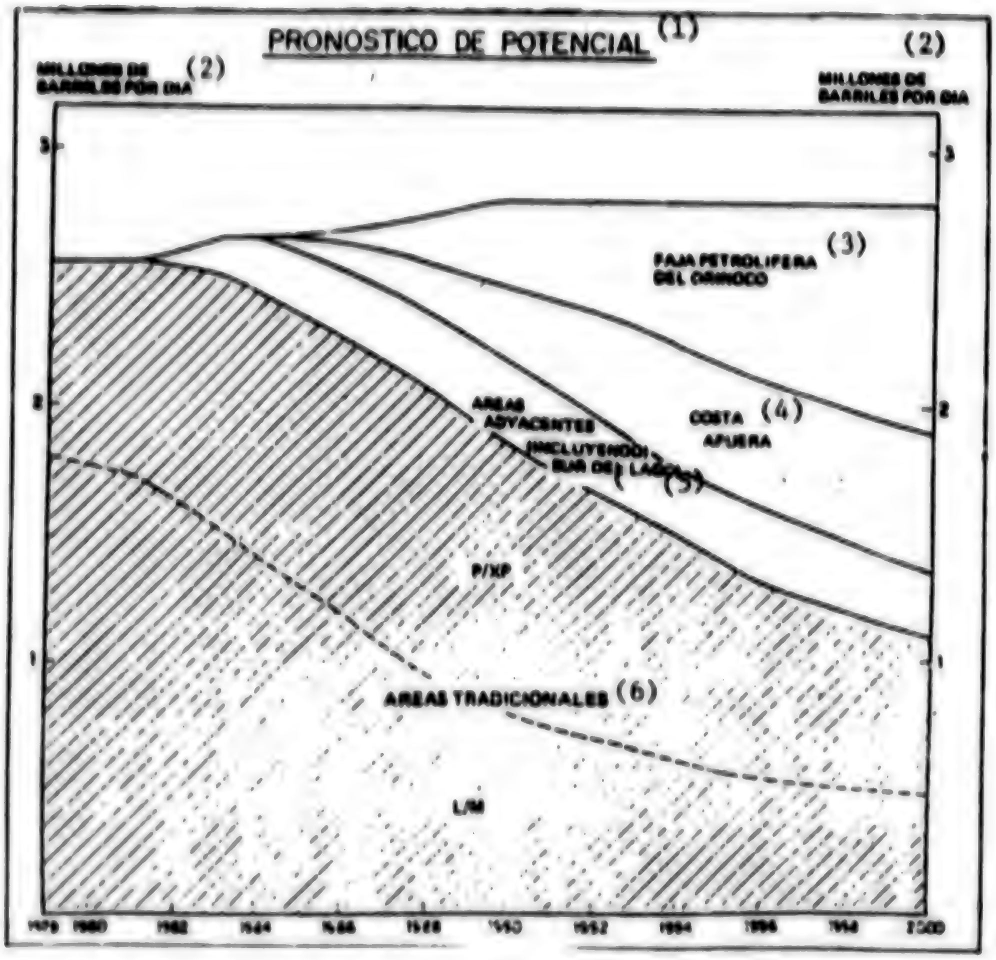
It bears mentioning that forecasts of domestic demand for liquid hydrocarbons assume that energy conservation and consumption rationalization policies will be put into practice and that more intensive use will be made of mass transit, both in and between cities (subways, railways, buses, etc).

The well-known forecasts for the development of the nonpetroleum sectors of the national economy envisage increasing amounts of foreign exchange and revenue from them. This has been duly taken into account in the country's development plans, which reaffirms the strategic advisability of making sure that the oil industry achieves an output capacity substantially greater than at present.

The forecasts of increased potential to be developed over time take into account the characteristics of and risks associated with the various types of oil and the new areas to be brought into production. Thus, the increases in light and medium crude oil potential in the riskiest areas, such as the Cretacean and offshore, are the hardest to achieve and will not yield significant amounts. In contrast, the certainty of large amounts of heavy hydrocarbons in the Orinoco oil belt makes it obvious that this area offers the safest and most reliable alternative for developing the additional output potential to complement the success we will achieve in light and medium crude oils, as well as to accomplish our medium- and long-term goals.

Nevertheless, given the lengthy period of time required to put up the infrastructure and basic facilities to produce major amounts of these heavy crudes, specific moves in this regard must be initiated in the Orinoco oil belt.

Furthermore, this goal is consistent with the approach of being in a position to sell what we have the most of and to conserve our valuable light and medium crude oils, is based on the available opportunities for placing these crude oils on the market and preserves Venezuela's traditional status as a sure and dependable source of hydrocarbons supplies.

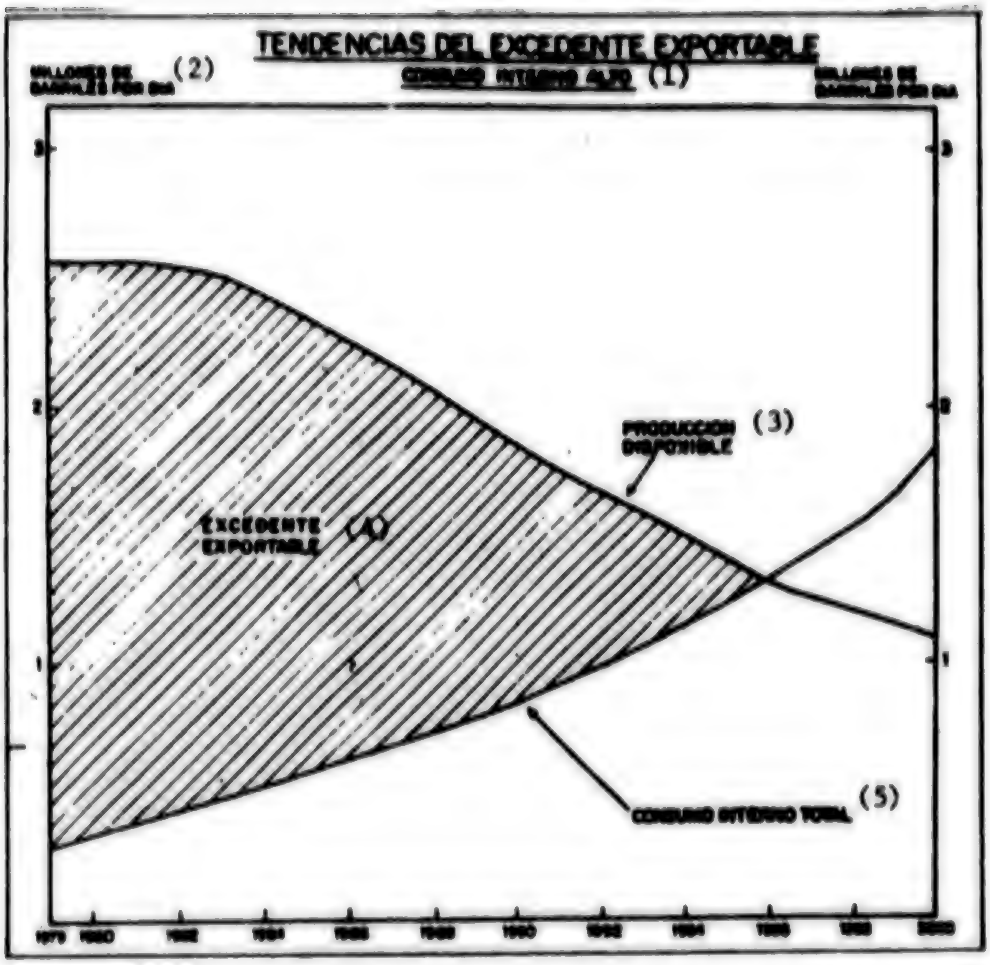


Key:

1. Forecast of production potential
2. Millions of barrels a day
3. Orinoco oil belt
4. Offshore
5. Adjacent areas (including southern part of lake)
6. Traditional areas

Trade Balance Trend

If the country wants to maintain growth rates (6.5 percent) that are somewhat below the historic rates for the nonpetroleum sector of the economy, the foreign exchange earnings from our exportable oil potential, combined with the earnings from nontraditional exports, will be insufficient to balance the country's trade as of 1993.

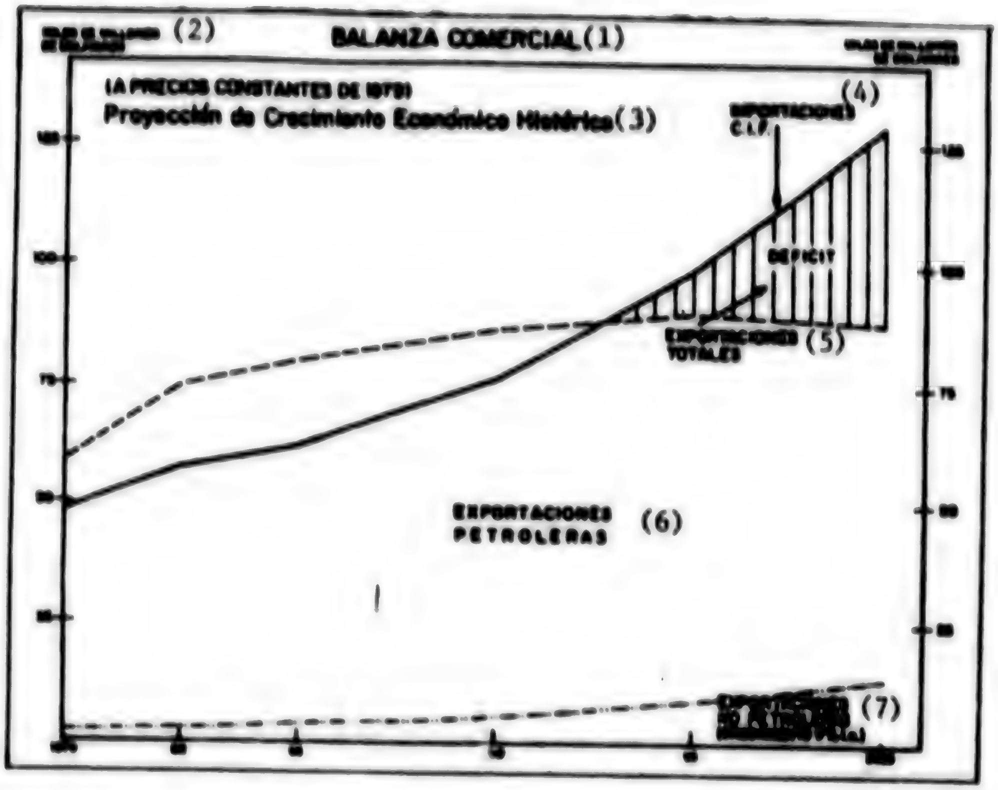


Key:

1. Trends in the exportable surplus (high domestic consumption)
2. Millions of barrels a day
3. Available production
4. Exportable surplus
5. Total domestic consumption

We should emphasize that in estimating nontraditional exports, we have taken into consideration the best plans for the development of the nonpetroleum sector and assumed that these exports will rise from 2.2 billion bolivars in 1979 to 14 billion by the year 2000. This entails a growth rate of nine percent a year. Balancing our trade by the year 2000 will require some 54 billion in nontraditional exports (a growth rate of 16.5 percent a year), which does not seem feasible.

If we look at all the components of the balance of payments, a deficit could occur by the mid-1980's.



Key:

1. Trade balance
2. Billions of bolivars
3. Projection of historic economic growth (in constant 1979 prices)
4. CIF imports
5. Total exports
6. Oil exports
7. Nonpetroleum exports (nine percent growth a year)

Trade Balance and Budget Trends

The foreign exchange earnings from our exportable oil potential and from nontraditional exports might not be enough to balance our trade as of the 1990's if we want to maintain growth rates of no less than five percent a year. Even if nontraditional exports increase at an annual rate of nine percent (faster than they ever have) and oil export prices rise in accordance with OPEC's pricing strategy, import financing will be adversely affected by the 1990's, or before all components of the balance of payments are considered.

At the same time, the declining contributions of the petroleum sector to total government revenues, as a result of higher operating costs and smaller amounts of lower quality oil available for export (even assuming that major adjustments are made in domestic hydrocarbons prices), will lead to a budget deficit as of 1990, even if we assume that the year-to-year growth rate in government spending is the same as the rate for the nonpetroleum product.

## BALANZA COMERCIAL (1)
### (A PRECIOS CONSTANTES DE 1979)
### PROYECCION DE CRECIMIENTO ECONOMICO HISTORICO

[illegible]

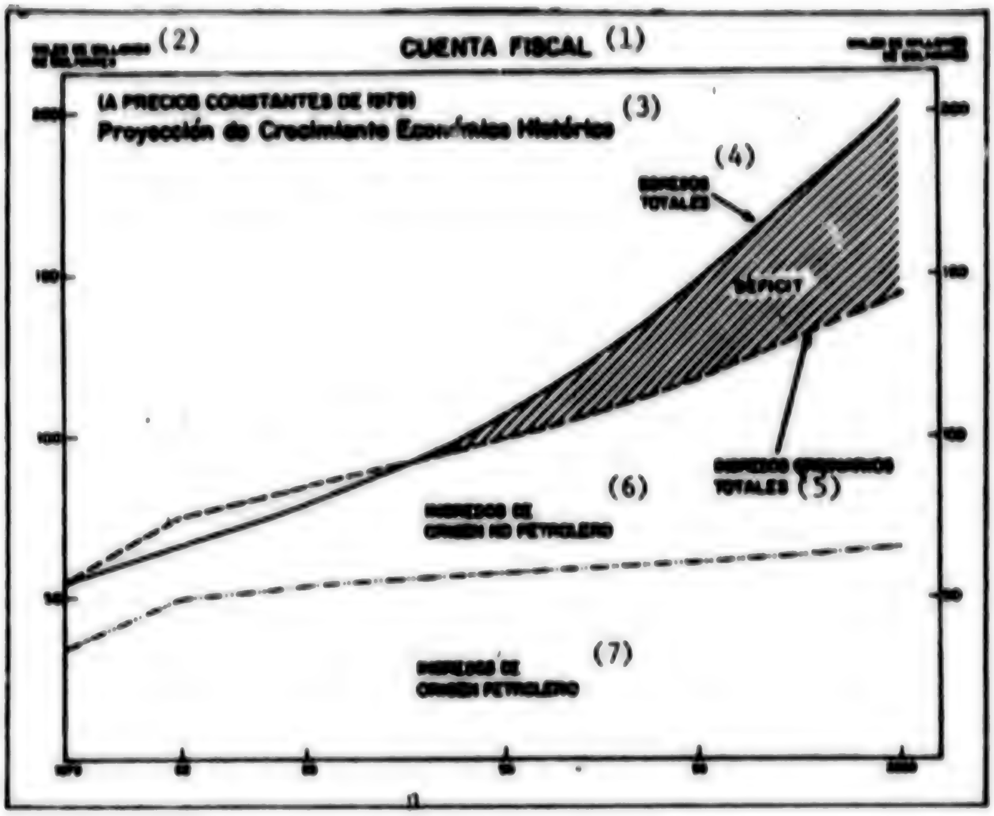
Key:

1. Trade balance (in constant 1979 prices), projection of historic economic growth
2. Unit
3. Average (1969-1979)
4. Base year 1979
5. Projection 2000
6. Percent growth 1979-2000
7. Oil production
8. Domestic consumption
9. Oil exports
10. Nonpetroleum GDP
11. Import ratio
12. Total GDP
13. Imports CIF
14. Nonpetroleum exports (estimated growth)
15. Trade balance

The yearly increases in nonpetroleum sector economic activity that would be needed to balance the country's trade and budget most likely exceed the highest and most efficient growth rates in any developing or developed country.

Trend in Government Revenue from Oil

In our calculations we have assumed that domestic pricess will increase gradually to 50 percent of the export price by the year 2000.



Key:

1. The budget
2. Billions of bolivars
3. Projection of historic economic growth (in constant 1979 prices)
4. Total expenditures
5. Total regular revenue
6. Nonpetroleum revenue
7. Petroleum revenue

Export prices are estimated in accordance with the OPEC-approved pricing formula, an increase of three percent a year (in real terms) as of 1 January 1981. Thus, if we assume a year-to-year inflation rate of 10 percent, the price of oil would stand at $80 in 1990 and $272 in the year 2000.

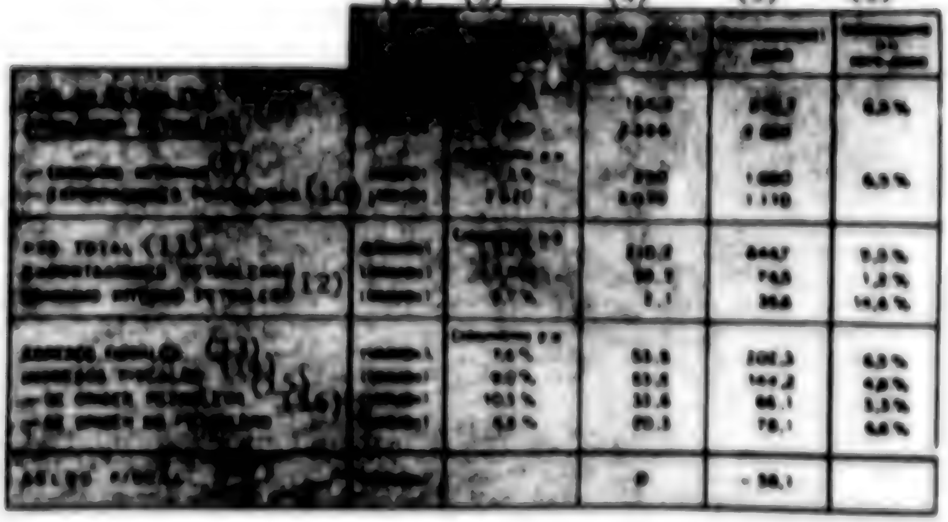
Constant 1979 prices were used in calculating government revenue and expenditures and the trade balance.

Trend in Government Expenditures

The declining contributions of the oil sector to total government revenues, as a result of smaller amounts of lower quality oil available for export (even if the domestic price of hydrocarbons is boosted sharply) will prompt a sizable deficit by 1990.

## CUENTA FISCAL (1)

(A PRECIOS CONSTANTES DE 1979)
PROYECCION DE CRECIMIENTO ECONOMICO HISTORICO



| | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|
| [illegible] (7) | [illegible] | [illegible] | [illegible] | [illegible] | 6.5% |
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| [illegible] (9) | [illegible] | [illegible] | [illegible] | [illegible] | 6.5% |
| [illegible] (10) | [illegible] | [illegible] | [illegible] | [illegible] | |
| PIB TOTAL (11) | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] (12) | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
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| [illegible] (15) | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
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| [illegible] (17) | [illegible] | | 0 | - [illegible] | |

Key:

1. The budget (in constant 1979 prices), projection of historic economic growth
2. Unit
3. Average 1969-1979
4. Base year 1979
5. Projection 2000
6. Percent growth 1979-2000
7. Nonpetroleum GDP
8. Oil production
9. Domestic consumption
10. Oil exports
11. Total GDP
12. Domestic oil consumption
13. Government expenditures
14. Government revenue
15. From oil
16. From sources other than oil
17. Budget balance

Government expenditures have been estimated to increase at the same rate as the nonpetroleum product (6.5 percent a year).

Conclusions

1. By the end of the century the country's demand for energy will stand at the equivalent of between 1.8 and 3.2 million barrels of oil a day (Even at these levels, the projected energy consumption per capita is much less than the current consumption in the developed countries).

2. The consumption of liquid hydrocarbons will stand at between 800,000 and 1.8 million barrels a day, which will reduce export capacity.

3. The output potential of traditional and adjacent areas is estimated at around 1.3 million barrels a day.

4. In order to achieve potential output of 2.8 million barrels a day, the new areas, the offshore zones and the belt in particular, will have to furnish some 1.5 million barrels a day by the end of the century.

5. The maximum input from offshore and other new areas is estimated at 500,000 barrels a day; the belt, therefore, will have to produce about 1 million barrels a day.

6. With a potential of 2.8 million barrels a day and production of 2.4 million barrels a day (85 percent of potential), the available volume for export, after deducting domestic market consumption, will be between 600,000 and 1.6 million barrels a day.

7. For calculation purposes, export prices will rise according to the OPEC formula (real growth of 2.5 to 3.5 percent a year), and domestic market prices will hit 50 percent of the world market price.

8. Even with export prices according to the OPEC formula, domestic market prices at half the world market level, a potential output of 2.8 million barrels a day and a reasonable level of consumption (1.1 million barrels a day), there could be balance of payments and revenue difficulties.

## Orinoco Oil Belt: Salient Characteristics

The belt is located in the southern part of Venezuela's eastern basin, north of the Orinoco River, covering an area 700 kilometers long and 50 to 100 kilometers wide. It contains a large number of deposits with oils of different properties and characteristics (see map).

Large accumulations of heavy and extraheavy crude oil have been known to exist in Venezuela since the 1930's. Large-scale development of them did not begin that decade, however, due to the abundance of light and medium crude oils, which were less expensive to produce, to low prices and to the lack of transportation and processing technology. Nearby fields north of the belt have been under development for many years and currently produce 140,000 barrels a day.

Geologically, the belt is made up of a series of structures with complex hydrocarbons accumulations that require an intensive exploration program to pinpoint deposits, identify deposition settings and determine the factors that condition the accumulations. To date, 300 wells have been drilled in the area, and oil ranging from 7 to 20 degrees API has been found. We should mention that oils of around 10 degrees API are extraheavy and very viscous. Nevertheless, due to the temperature of the deposit, the oil is able to flow to the surface and can be produced by conventional techniques.

Because of their viscosity and high sulfur and metal content, the crude oils from the Orinoco belt are difficult to transport and to process at conventional refineries.

## Exploration and Evaluation

The resources in the belt must be properly evaluated in order to design the development programs that will have to be undertaken over the next few years. In addition, it will be of great strategic importance for Venezuela to have major new proven reserves.

Estimates of the in situ oil in the belt range from 700 million to 3 billion barrels, but they are based on the little information that is available. Hence, the evaluation strategy is to conduct the exploration, research and planning studies as quickly as possible to determine and quantify the resources in the zone. To this end, in mid-1979 PDVSA drew up a comprehensive evaluation and planning studies program for the development of the belt. The program was approved by the MEM, and its goal is to complete the regional exploration of the belt by 1983. It calls for the surveying of 16,000 kilometers of additional seismic lines and the drilling of 300 exploratory wells and some 1,000 evaluation wells. Because of the extensive area to be covered and the amount of exploration work to be done,PDVSA decided to divide the oil belt among the four operating enterprises for exploration purposes.

## Evaluation Strategy

The program to evaluate the belt consists of the following stages:

1) General exploration to better determine the distribution and quality of the crudes.

2) Selection of the most promising areas and thorough exploration of them to pinpoint the best ones.

3) Pilot production and additional recovery projects that are needed for the technical and economic planning and assessment of future developments

4) Evaluation of existing enhancement processes and development of new processes tailored to the conditions and specifications of crudes from the belt.

5) Planning studies to determine the technological, human, organizational and financial resources needed for development and to assess the socioeconomic and environmental impact of development on its area of influence.

The exploration program is based on the results of preliminary geological studies and on the experience gained by the affiliates in fields adjacent to the belt. The program will be adjusted and/or modified as additional information becomes available and as the geological models undergo adjustments.

The drilling is aimed mainly at Tertiary and Cretaceous objectives, and production tests will be conducted in successful wells in order to ascertain parameters such as productivity and the characteristics of the fluids produced (oil, gas and water).

### Advanced Drilling

At the same time as the general exploration program, a drilling program was started in 1980 whose goal is to conduct a more detailed assessment of the areas that have been identified as priorities based on available information. This program will determine the limits, the continuity and the size of the deposits, in the hope of pinpointing the most attractive areas for future development. Estimates are that some 380 wells will be drilled from 1980 to 1984 to assess the two priority areas identified so far.

### Pilot Tests

In light of the characteristics of the deposits and the results of alternate steam injection pilot testing in fields north of the belt, where productivity rates three times greater than cold temperature production were achieved, alternate steam injection is expected to be very important in its future development. In addition, other thermal processes regarded as well-suited to the characteristics of these deposits will be evaluated. To this end, two pilot steam injection projects are being built, and an in situ combustion project that was under way but later suspended due to operational problems is being reconsidered. The two pilot projects under construction are the Cerro Negro alternate/continuous steam injection project and the Jobo continuous steam injection project. The combustion project is in the Melones field.

The Venezuelan oil industry's experience in extracting, handling, transporting and processing heavy and extraheavy crude oils, particularly in the fields north of the belt and in the western part of the country, does not obviate the need for further research. On the contrary, research is necessary to adapt existing technology and to develop new methods, techniques and processes for optimizing production from these fields.

### Development and Production

Based on the results of the exploration campaign in other areas of the country, estimates are that the belt will add 200,000, 600,000 and 1 million barrels a day to the country's output potential by 1988, 1995 and 2000, respectively. It will provide a major, growing input that will require extraordinary efforts from the industry. If we take into account the complexity of the operations and the time needed for planning and execution, an assessment of the belt is obviously necessary, particularly in the areas that are crucial for future development.

The following assumptions have been made in connection with the planning for the development of the oil belt:

1) The government will continue its conservation policy, and the country's output potential will be 2.8 million barrels a day for the 1990-2000 period (including input from the belt).

2) The exploratory campaign currently under way offshore and in other new areas will bring in about 500,000 additional barrels of oil a day.

Orinoco Oil Belt (Production Potential Goals by Area)

| | Millions of Barrels a Day | | | |
|---|---|---|---|---|
| | 1983 | 1988 | 1995 | 2000 |
| Cerro Negro-Cogollar | -- | 125 | 300 | 500 |
| Areas near fields under development | 50 | 75 | 100 | 100 |
| Second priority area | -- | -- | 200 | 400 |
| | 50 | 200 | 600 | 1,000 |

Therefore, the production from the belt will depend on the economic and energy policies that the government establishes and on the time required to develop the deposits.

Development Planning Objectives

The planned development of the belt calls for several stages, in line with short- and long-term output potential requirements and in keeping with the guidelines set by the Executive Branch. These stages are:

1) To produce 125,000 barrels a day of enhanced crude by 1988 and to develop a total output potential of 500,000 barrels a day by the year 2000 in southern Monagas and Anzoategui. This stage is known as the DSMA Project.

2) To develop a production potential of 100,000 barrels a day by 1988 in Meneven's existing facilities in Anzoategui State. This stage is known as the Guanipa 100 Project.

3) Based on the results of exploration, to select a third commercially attractive area, not yet defined, to produce 200,000 and 400,000 barrels a day by 1995 and 2000, respectively.

Production Considerations

The following factors must be taken into consideration:

1) Due to the high temperature of the formation, the oil moves in accordance with deposit conditions. Therefore, production is possible by means of the primary methods that the industry currently uses, such as conventional mechanical pumping, mechanical pumping with the aid of a thinner and artificial gas lift.

2) To improve the rate of production and because of the high viscosity of the crude oil, thermal methods will be used for well production.

3) The oil must be mixed with thinner to be dehydrated and transported.

4) Alternatives for the transportation and marketing of oil:
   a) Oil enhancement in the production area
   b) Blending with less heavy crudes in the production area and/or at shipping terminals
   c) Blending with enhanced crude
   d) Blending with light crudes from other countries

e) Converting the country's refineries so that they can process oil from the belt.

5) Adequately tested technology will be utilized

6) The aim will be to achieve an energy balance in the overall system of production/enhancement

## Production Methodology

Due to the characteristics of the deposits and to the productivities of wells on which production tests were conducted, development will begin with primary production methods and well-known secondary recovery techniques that have been tried in the area. Thermal secondary recovery processes are considered best suited to the conditions and characteristics of the deposits in the belt. Alternate steam injection followed by continuous steam injection and/or in situ combustion seems to be the most appropriate development strategy. Thus, estimates are that total recovery could reach more than 30 percent of the in situ petroleum in some of the wells. An average recovery of 20 percent of the in situ petroleum is expected for the entire region, however, though this does not take into account other production mechanisms such as compaction, which is being used in Dtto. Bolivar in Zulia State.

We should emphasize that Venezuela has had ample experience with thermal processes, steam injection in particular, having undertaken about 50 projects, many of them on a commercial scale, over the last 20 years. To date, steam has been injected in more than 2,000 wells, and 215,000 barrels a day are currently being produced by thermal methods.

## The Orinoco Oil Belt in the National Context

PDVSA and its affiliates realize that the exploration and subsequent development of the Orinoco oil belt will have a major impact on the nation. Initially defined as an ambitious oil research and development project, the industrialization of the belt offers two other important facets that are unrelated to oil:

1. This project is so enormous and complex that for many decades to come it will provide an ongoing field of action in other sectors of national life.

2. It is the first major exercise in the planned incorporation of oil-related activities into the process of economic and social change in the country.

In the first point we are acknowledging that at present some of the equipment, materials and inputs required for the development of the belt, as well as many of the specialized technical and engineering services needed, are available in Venezuela. Thus, an initial result of this project will be the expansion of the country's current industrial, technical and service capabilities, in order to meet its mounting design, materials procurement and construction requirements. This expanded production potential of domestic goods and services will rest on an increasingly solid groundwork to the extent that the project is carried out in a steady and even repetitive fashion in the context of long-range planning, that it moves forward without haste but without pauses and that its construction pace promotes the accelerated growth of the country's production capacity. One of the main objectives of the oil nationalization will thus be fulfilled.

In the second point we are looking at the development of the belt as a powerful and specific catalyst for coordinating the initiatives and efforts of the national oil industry with the capacity for effective and enthusiastic response of other sectors of Venezuelan life. It so happens that economic and social change in Venezuela goes beyond the field of action and the very scope of oil industry planning, but the contributions of the sector that extracts the country's most important mineral resource can certainly far transcend the government revenues it furnishes and the foreign exchange it generates if its projects and programs create a wave of expansion that encompasses other manufacturing and service sectors.

Seen in this light, the development of the belt will represent the country's first vehicle of its own for mobilizing planning and operational coordination among sectors to maximize benefits to the nation.

With regard to the manufacturing sector, the idea is to utilize the oil industry as a whole and the development of the belt in particular as focal points for a new national strategy that will empahsize the production of capital goods, because this sector can achieve rapid growth and a high degree of autonomy and thus contribute to a qualitative change in Venezuelan industrialization.

This is the goal of the National Council for the Development of the Capital Goods Industry, which was set up pursuant to Decree 621 of 26 May 1980, inasmuch as this industry has a great potential for replacing imports and promoting exports, at the same time that it can facilitate greater national integration by utilizing the country's mineral resources and its iron and steel production capacity.

This is a unique opportunity to develop the capital goods industry. The major medium- and long-term investments programmed for the oil industry and other production sectors (electricity, basic industry, construction, communications and transportation) will lay the groundwork for considerable growth in the national machinery and equipment industry.

PDVSA has offered the recently created National Council its fullest cooperation, aware of the multiplying effect that the capital goods industry will have on the rest of the economy.

Along these same lines, PDVSA/INTEVEP have been doing a great deal to help the plants and shops that already exist in the country, as they have managed to convert them, through advice and recommendations, into major suppliers of the national oil industry. This has prompted a quick rise in the number of domestically produced goods that the oil industry buys and has awakened greater interest on the part of private businessmen in industrial supplies for the country's oil industry.

Venezuelan engineering and specialized technical services will be able to look to the development of the capital goods industry and see an exact replica of their future. It is for the same reasons of the national interest and independent development that PDVSA and its affiliates are opening their doors wide to specialized enterprises with experience in design, materials procurement and construction, as well as to the domestic companies that provide goods and services. The belt is a new and particularly important focus of attention, inasmuch as this single project entails sustained long-range demands, interesting professional challenges and technology transfers of prime importance.

A word of clarification is in order here. The national oil industry is not an an agroindustrial promotion agency nor a financial institution to promote services. Rather, PDVSA and its affiliates are involved in creating scenarios that other sectors can take advantage of and in providing the initial push and the essential follow-up so that the initiatives undertaken do not come to a halt or lose momentum. The understanding is that the planning and execution of non-oil-related activities is the work of other public and private bodies, depending on the nature and scope of each activity to be undertaken.

The crucial period for achieving higher levels of national benefits from the development of the belt is limited to the next 4 or 5 years. This is the minimum time needed to make major gains in the aforementioned industrial and services conversion and to awaken nationwide enthusiasm for the ambitious project that Venezuela will be undertaking in doing most of the work to develop the Orinoco oil belt.

## The Orinoco Oil Belt In the Regional Context

To PDVSA and its affiliated enterprises, the exploration and subsequent development of the Orinoco oil belt involve another parallel and inseparable process of regional integration of oil-related activities, which is based on these two elements: 1) the management of the vast territory that the belt covers, and 2) careful attention to its ecological system. Implicit in these two elements are promoting an efficient agricultural and industrial structure and fostering environmental conditions that will give men working there a sense of accomplishment and provide acceptable levels of well-being for residents.

### Land Management

From 1977, when architect Marco Negron's study entitled "Initial Assessment for a Comprehensive Development Plan for the Orinoco Oil Belt" was published, to date there has been a great deal of discussion about the environmental impact that the development of the hydrocarbons deposits in the subsoil of the vast belt along the northern shore of the Orinoco River will have on the states of Guarico, Anzoategui, Monagas, Bolivar and the Amacuro Delta Federal Territory; about the creation of urban and road infrastructure in the area; about the conflicts that will arise over land use for oil, agricultural, forestry and industrial activities, and about the scope of intervention by various public bodies (federal, state and municipal), state-run enterprises and private groups interested in the region.

We can conclude from all of these discussions that a Land Management Plan, like the one that MARNR and PDVSA agreed to draw up on 10 June 1980, is indispensable. This plan will coordinate in space and in time the multiple activities that will arise from the development of the belt and reconcile the actions of the oil, agricultural, forestry, industrial and urban sectors with environmental limitations and with existing natural resources, thus guaranteeing their rational utilization and their conservation, as well as preserving the quality of life for the people who are to reside in the area.

The Land Management Plan will have the following basic guidelines: to support the development of the oil industry in the area; to propose specific policies for the development of economic activities (production and services) linked to the oil industry, to the economic bases of neighboring regions and to the supply of final goods and services for the area's residents; to regulate the urbanization process established by the various production programs; and to monitor the processes of renewable natural resources utilization as well as their contamination or deterioration, in order to minimize damage to natural resources and urban environments. Specific policies and criteria will arise from the plan itself, from the oil belt development program that is adopted and from an economic analysis of the environmental impact of this development.

The studies required for the ultimate formulation of the plan have been designed so as to create successive decision-making mechanisms.

There are thus three very important milestones in the sequence of activities:

--The proposal of criteria and controls for several alternative scenarios of land management and environmental protection.

--The further development of two preselected options, with a more accurate estimate of costs and a preliminary investment program.

--The formulation of the plan proper, for the option that is ultimately chosen, including a projects schedule, the establishment of policies and the drafting of definitive standards for environmental control.

As far as the national oil industry is concerned, the comprehensive development of the oil belt region must involve the construction of communication routes, which are currently scarce in the area, including roads, railways, airports, ports, shipping networks and telecommunications. As far as urban centers are concerned, there is a firm intention to move towards the integration of communities by leaving behind the anachronistic element of sealed-off oil camps. With regard to the development of agricultural and livestock zones, technical assistance has been sought to formulate policies connected with land use, the establishment of farms, technical aid for farmers and ranchers, personnel training among peasant farmer youth and the settling of rural residents in the zone. Paramount importance has also been attached to aid programs for manufacturing industries that utilize raw materials from the region itself or from nearby regions.

In drafting the Land Management Plan, the MARNR already has an interdisciplinary task force that can properly coordinate the physical, social and economic facets that will serve as a framework for the various activities to be undertaken in the oil belt and for its relations with the rest of the country.

## Environmental Protection

An ambitious and complex project like the development of the Orinoco oil belt, with its components of crude oil production, enhancement, transportation and storage, export terminals, power generation, services infrastructure and housing needs, encompasses activities that are likely to affect the environment.

For this reason, INTEVEP, as PDVSA's research center, has drafted a program for studying the environmental impact of the development of the oil belt that will serve as a guide and, so to speak, an instrument to respond consistently to the controls and regulations that might be required of it at any time.

The basic objective of the study program is to pave the way for defining and evaluating, using systems analysis procedures, various options and strategies for the monitoring and management of the environment during the development of the oil belt, while presenting them in such a way that they facilitate decision-making for the adoption of a master plan comprising all of the monitoring activities conducive to the sought-after balance between the development of the oil industry in the area, the conservation of natural resources and adherence to the provisions of the Organic Law of the Environment.

The program includes a matrix of interaction among development activities and the environmental conditions that might be affected, thus identifying the paramaters and problems that will arise during the development of the oil belt. It also specifies the tasks needed to define and analyze environmental quality problems and classifies these tasks by sector. These sectors have to do with the following basic areas:

--Development scenario
--Surface waters
--Air and noise
--Soils and underground waters
--Flora and fauna
--Socioeconomic
--Accidents

The specific tasks to be carried out have then been developed to an operational level, and their scope, resources, duration and implementation alternatives have been accurately determined.

The oil industry has approached the "environmental impact" facet of the oil belt development in a consistent and comprehensive manner and feels that the program it has drafted is a very important step forward, because it will lead to a master plan for the monitoring and management of the environment of the oil belt zone that will insure a balance between oil industry development and environmental protection.

In the judgment of PDVSA and its affiliated enterprises, the program should be regarded as a frame of reference within which various decisions and several operational plans are possible. It is a meticulous and well-thought-out planning study that will help to reasonably insure that the various objectives that an environmental impact study should include are not overlooked, that priorities are established in the study that are in keeping with the development of the industry, that omissions or deviations do not occur that might lead to unnecessary emphasis on secondary goals, that the true dimension of each impact to be assessed is not lost from sight and that the best use is made of available resources.

Environmental impact studies are unavoidable. In the case of the development of the oil belt, they are costly in absolute terms but not in relative terms if we bear in mind that an initial assessment reached the conclusion that they would not exceed 0.1 percent of the total cost of developing the oil belt. They are partly the untransferable responsibility of state-run agencies, under the current legal code.

Given the magnitude of the efforts involved, it would be advisable to stress the benefits that will accrue from the studies to define and assess the options most conducive to a balance between the development of the oil belt and the monitoring and management of the regional environment. We should underscore the following direct benefits, among others:

a) Pollution control equipment is much easier and more economical to install during the construction phase. Moreover, inflation could make any delay very costly.

b) The planning of environmental controls through environmental impact studies and the application of appropriate measures to minimize damage is much less costly than resorting to after-the-fact corrective measures and/or environmental cleanup efforts.

c) The development of the oil belt would not be at all delayed by environmental issues.

Aside from these direct benefits that make environmental studies highly worthwhile, we can point to other indirect benefits such as the preservation of intangible environmental assets.

Public opinion has has an important effect. Citizen awareness of this problem and the public opinion movements to safeguard the environment will be much stronger in the future than they are now and they will hold PDVSA and its affiliates responsible for not having taken the measures needed to preserve the ecological system of the Orinoco oil belt.

## Conclusions

1) The results of the exploration campaign in the Orinoco oil belt confirm the existence of large volumes of hydrocarbons with characteristics similar to those in other Venezuelan heavy crude oil fields.

2) In order to maintain a production potential of 2.8 million barrels a day from 1990 to 2000, the oil belt must begin to produce in the medium term and its input must rise steadily over time.

3) Due to the characteristics of the crude oils in the belt and the degree of socioeconomic development there, lengthy planning, design and construction periods are required.

4) Although the oil belt can be developed with existing technology, an ambitious research program has been undertaken, ranging from the conversion of current technology to new technological developments.

5) Two production projects have already been worked out, and the industry is confident of achieving its long-range goals.

6) The development of the oil belt will promote wideranging regional economic development, including the agricultural and livestock sector, capital goods industries and service, engineering and construction companies.

7) A land management study is needed to coordinate in space and in time the various activities to be performed, and follow-up plans are required to offset social imbalances and adverse environmental impact.

Research and Technology: Technological Research in the Orinoco Oil Belt

Technological research activity in the Orinoco oil belt is closely tied to the strategic planning of the oil industry, inasmuch as it will have to anticipate the technological requirements and opportunities that will arise with long-range plans.

In anticipation of the technical problems that the oil industry is going to face in producing and marketing crude oil from the belt, INTEVEP is conducting research work in exploration, production and refining, focusing on the areas connected with the characteristics of the belt and its crude oils in which technical problems remain to be solved.

Such is INTEVEP's interest in the oil belt that research work related to it accounts for 33 percent of the institute's total operational budget. Parallel to this, 9 million bolivars are being invested to build and outfit a field laboratory in the oil belt. Furthermore, work is proceeding actively on two relatively large pilot projects in the oil belt area (Jobo and Cerro Negro), for the purpose of obtaining information on the performance of production systems under varying operational conditions.

The following factors have been taken into account in designing research programs in the oil belt: existing technological problems and needs; the experience of PDVSA affiliated operating enterprises in the phases of exploring for, producing and refining heavy and extraheavy crude oils, and the research programs for similar situations that are being developed in other countries. This lends an element of comprehensiveness to INTEVEP's research projects.

Among the various technological research projects that INTEVEP is carrying out in connection with the oil belt, the following command a priority status at present:

A. Those dealing with the technical and economic feasibility of transporting heavy and extraheavy crudes over long distances through pipelines without thinning them with other components or enhancing them at special facilities. A solution to this problem would lend considerable flexibility to the comprehensive development of the oil belt and would also be a determining factor in the ultimate location of the enhancement plants.

B. Those having to do with the assessment, testing and selection of enhancement processes for crude oils from the belt. INTEVEP is conducting twofold research in this field. On the one hand, it is analyzing the processes that have been developed elsewhere in the world that could meet the needs of the Venezuelan oil industry, and on the other it is developing an enhancement alternative designed in INTEVEP itself.

C. Projects involving the assessment, quantification and location of the belt's hydrocarbons resources. Although the belt is acknowledged to contain sizable hydrocarbons deposits, it is imperative to quantify these deposits and to poinpoint their distribution as accurately as possible.

D. Those connected with an overall energy assessment of operations in the belt. Given the importance of the industry's own consumption of fuels, research is being conducted on joint power generating processes, practical and feasible solutions for burning coke to produce steam for injection, as well as various possibilities for generating electricity. The goal is to optimize the bottom line on energy use and production in these operations.

E. Projects having to do with the best methods of thermal recovery (alternate versus continuous steam injection) and with determining the impact that compaction has on the efficiency of these practices.

In addition to the aforementioned priority activities, the following elements are of great importance for the development of the oil belt and for operations in the zone:

--A comprehensive plan for social development and preservation of the environment, in direct cooperation with the appropriate governmental agencies. INTEVEP's contribution to this plan is primarily geared towards safeguarding the environment and preserving the ecological system.

--An oil industry strategy to encourage the domestic manufacture of materials, equipment and inputs that are used frequently in its operations. INTEVEP's programs for controlling the quality of domestic materials and equipment for the oil industry are of assistance to Venezuelan industry and will, therefore, enable its products to be used more widely in oil belt development plans.

--Because of the complexity and magnitude of the technological challenge posed by the oil belt, coordinated participation is required from the organizations involved in applied research, development and engineering in Venezuela, in addition to INTEVEP's own efforts. To this end, INTEVEP has established pacts with national universities and the Venezuelan Institute of Scientific Research (IVIC) so that they can take part in some of the research work that is currently being conducted. In addition, PDVSA and its affiliates have worked out a strategy for the development and strengthening of Venezuelan engineering and construction companies so that they can participate in oil industry activities and in particular in the development of oil belt projects.

Keeping in mind the aforementioned elements, we will now proceed to give a brief description of the projects being conducted specifically for the oil belt.

## Brief Description of the Projects for the Orinoco Oil Belt: Exploration and Production

### 1. Integrated Model of Heavy Crude Development

This project developed a mathematical model that will make possible technical and economic feasibility studies on various integrated production-enhancement systems that include all development options, such as: production by different procedures of secondary recovery and crude oil enhancement, dehydration, desalinization, steam generation and distribution, supply and treatment of water, etc. This model was developed under the technical cooperation agreement signed with the FRG.

### 2. Sedimentological Model

Determining the deposition characteristics needed to construct the sedimentological models of production formations; these models will indicate the optimum production method in the various areas.

### 3. Biostratigraphic Zoning Study

Study of the palynological and paleontological characteristics of the sediments to determine sedimentation environments and geological ages.

### 4. Geophysical Models and Processing

Special processing of seismographic data on the Orinoco oil belt to enhance their resolution and interpretation.

### 5. Petrophysical Model for Extraheavy Crude Oils in Nonconsolidated Rock

Determination of parameters and formulation of equations for evaluating the logs taken in wells in the oil belt.

### 6. Study on the Origin and Distribution of the Various Types of Crude Oils

Organic geochemistry studies to determine the possible source rocks in the eastern basin of Venezuela and their relationship to the hydrocarbons present in the oil belt.

### 7. Research Into Enhanced Recovery by In Situ Combustion

The project aims at determining the technical and economic feasibility of this recovery method in the Melones field and its potential extrapolation to the oil belt deposits.

### 8. Handling, Treatment and Transportation of Heavy and Extraheavy Crudes

This project will evaluate new techniques and methods for the dehydration, desalinization and transportation of heavy crude oils, which due to their particular gravity and viscosity characteristics require nonconventional approaches.

### 9. Optimized Energy Use in the Production of Heavy and Extraheavy Crude Oils

Processes and technologies will be determined that will make possible a more efficient use of energy in the various oil belt production systems. Work includes research into long-range steam transport, assessment of various thermal insulators, use of the production water to generate steam, steam injection in deep deposits, joint generation of electric power and steam, and the utilization of various fuels of low commercial value.

### 10. Environmental Studies

The main goal is to assure the comprehensiveness of studies on the "environmental impact of oil industry operations" and to help the operating companies identify and evaluate environmental monitoring and management options. The project divides the environment into four interrelated sectors: surface waters; soils and underground waters; air; flora and fauna. In light of its importance, the Orinoco River system is included as a special element.

### 11. Field Laboratory in the Orinoco Oil Belt

The project involves the construction and outfitting of a field laboratory in the Orinoco oil belt to support the exploration and production activities, field tests and research projects that are being carried out in this important area of oil industry activity.

The laboratory will preferably be located in the San Tome-El Tigrito area, where the support infrastructure is currently more developed than in any other area of the Orinoco oil belt. A total investment of 9 million bolivars is involved.

## Refining

### 1. Enhancement of Heavy Crude Oils

The objective of this program is to support one of the strategies proposed for the marketing of heavy crude oils from the Orinoco oil belt. This strategy consists of enhancing the quality of these oils so that they can be transported to and accepted at conventional refineries. The program calls for an analysis of heavy and extraheavy crude oil enhancement by indirect methods (hydrocracking and hydrotreatment, and subsequent deasphalting and hydrodesulfurization), by direct methods (hydrocracking, direct hydroconversion) and by coking heavy fractions.

2. Determination of Characteristics of Orinoco Oil Belt Heavy Crudes

Physical and chemical analysis of Orinoco oil belt crudes to ascertain their properties and to subsequently determine the most appropriate methods of production, transportation and processing.

3. Development of Catalysts

This project involves the selection and synthesis of new catalysts to make available hydrogenation processes economical.

Pilot Production Projects

Among the most important research activities currently under way are two pilot projects that are closely tied to the Orinoco oil belt:

The Jobo Project

This pilot project involves the continuous injection of steam into 6 hexagonal setups that include 6 input wells, 22 producing wells and 3 observation wells. The setup was designed and the wells spaced so as to evaluate the performance of this type of deposit under conditions similar to a commercial development.

The project will enable the industry to evaluate the technical and economic parameters needed for optimum planning of a commercial operation in the future. Factors such as the following will be evaluated: spacing between wells, injection rates, intervals of completion, debris removal efficiency and recovery coefficients. These factors will make possible the calibration of the mathematical simulators, an assessment of the technical and economic feasibility of the process, comparisons with other recovery methods and a determination of the future development strategy. Information will also be obtained regarding: experience in the operation of production/injection facilities in this particular area, the latest completion [completacion] techniques and a detailed description of the deposit. All of this experience will be of great importance for the future development of the large deposits in the Orinoco oil belt.

This project will begin operations in December 1980.

The Cerro Negro Project

This project consists of a hexagonal arrangement of seven producing/injection wells and three observation wells. Its main objectives are:

To evaluate the potential of the target area through cold temperature production and by mechanical pumping of the seven wells in the project.

To undertake alternate steam injection in the seven wells in order to ascertain the performance of this area in particular in response to this production process, as well as the number of cycles that can be economically performed, the effect of spacing, changes in the properties of the fluids produced, etc.

After the alternate steam injection cycles, research will be conducted into the effect of continuous steam injection. This will make possible an evaluation of factors such as recovery rate, injection rate, thermal efficiency, efficiency of displacement, etc. This evaluation will enable the industry to compare these results with the results of the Jobo Project, where continuous steam injection will be carried out directly from the beginning. Moreover, experience will be gained in the separation, measurement and treatment of this type of extraheavy crude oil, which could require nonconventional techniques and methods. This experience will be of great use in designing the facilities for the DSMA Project.

This project will begin operations at the end of the third quarter of 1981.

## Development of Southern Monagas and Anzoategui: DSMA Project

PDVSA has commissioned its affiliate Lagoven S.A. to develop a comprehensive project for the production, enhancement and transportation of some 125,000 barrels a day of crude oil from southern Monagas and southern Anzoategui. The approach to the project must take into account the potential expansion of operations in this area of the oil belt to some 500,000 barrels a day by the end of the century.

The decision has been made to undertake this project in the locality called "Cerro Negro," which is near the production operations that Lagoven is currently engaged in.

## Lagoven Activities in Southern Monagas

Oil-related activities have been going on in southern Monagas State since the mid-1930's.

In the wake of the nationalization of the oil industry, the leases of the companies Creole, Phillips, Amoco and Texaco were assigned to Lagoven for development.

Its vast experience with operations in this area has been of great value to Lagoven in planning the project with which it has been entrusted.

The dark line on the map shows the limits of the areas currently assigned to Lagoven to operate. South of the line lies what has conventionally been called the oil belt. Except for pine tree plantations in Uverito and nearby areas, the zone is virtually devoid of high vegetation. The territory is scantly populated, and the zone is little developed. Temblador and Ciudad Guayana are the closest towns to the area of operations.

## Planning Guidelines

The project is being planned in accordance with the following general guidelines:

The project calls for the production of about 125,000 barrels of enhanced crude oil a day from the Cerro Negro area. It must be ready to begin operations by late 1988.

Commercially tested production, enhancement and transportation technologies will be employed so as not to compromise the success of the project. In this regard, it bears mentioning that the commercial development and testing of new processes generally takes about 10 years. Future developments of the oil belt could employ new technologies that have not yet been tested. In this connection, INTEVEP, the oil industry's research agency, is pursuing an active program to develop new transportation techniques and new catalytic enhancement processes that might be of interest in the future.

The designs will take into account a potential expansion of operations in the Cerro Negro area to as much as 500,000 barrels a day by the year 2000.

The participation of domestic engineering, services and capital goods manufacturing firms will be maximized in all phases of the project, from its formulation to its implementation.

A domestic personnel development program will be begun at the opportune time to assure their training and timely availability. It bears mentioning that an estimated 3,000 persons will be working permanently in the Cerro Negro area once the installations are completed; this will create some 15,000 direct and indirect job posts.

The designs to be used will pay special attention to protecting the environment.

## Crude Oil Enhancement Needs

The characteristics of the crude oils in southern Monagas in the belt are such that their transportation and processing at conventional refineries are difficult. In the first place, they do not flow at ambient temperature due to their high viscosity. They have to be heated or diluted with less viscous hydrocarbons in order to be transported to a port of shipment. This characteristic is even more of an obstacle at the port of destination if the crude oil has to be pumped to the refineries in existing pipelines, which require a low viscosity so that their capacity is not reduced.

Transporting sizable amounts of crude oils in their natural state at a refinery outside the area would require amounts of thinners that the country could not possibly have access to. For this basic reason, there is no other alternative for southern Monagas than to proceed with the first project on the basis of crude oil enhancement.

If market conditions permit, this same enhanced crude oil could be used as a thinner to thus achieve a total production potential of 500,000 barrels a day, without having to build additional enhancement plants.

## Main Components of the DSMA Project

The output of 125,000 barrels a day of crude oil will come from some 1,000 wells. In addition, some 20 flow stations and steam injection installations are scheduled to be built.

The most complex component of the DSMA Project is the enhancement plant. The design calls for two parallel lines for distillation, delayed coking and hydrogenation. The enhancement plant will have all of the services characteristic of such an installation, as well as the storage tanks needed for both raw and enhanced crude oil. It will also have an electric powerplant with a 300 megawatt capacity.

The crude oils in the belt are unusual partly because they are very deficient in hydrogen; in other words, they have a very low hydrogen to carbon ratio. Enhancing these crudes consists basically of substantially altering this ratio.

After the various commercially tested primary enhancement processes were compared, the one known as "delayed coking" was selected. Refiners have used it for more than 40 years, and therefore this technology is in the public domain, which means that its use does not entail the payment of licensing fees or royalties.

The primary enhancement process selected to convert southern Monagas crude oil into a higher grade crude oil with a low sulfur, metal and carbon content will assure its acceptance both on the domestic and on the world market.

With regard to the port for shipping the enhanced or diluted crude oil to refineries in Venezuela or to export markets, options for its ultimate location are under study. Once a shipping site is decided on, work will begin on designing the pipeline needed to transport the crude oil there.

As far as infrastructure is concerned, even though the existing infrastructure in the region is going to be used to a great extent, a small community will have to be built north of the Orinoco River near Ciudad Guayana. This community is expected to grow steadily until it eventually houses some of the 3,000 permanent employees who would be working in the area. Roads and a communications system will also naturally have to be built in the area, as well as a public water system fed by the Orinoco River.

Location of Installations

The map indicates the approximate location of the facilities under consideration. As we can see, the zone that Lagoven will be developing by the end of the decade is a square-shaped area 15 kilometers to a side. This represents just four percent of the entire area assigned to Lagoven in southern Monagas and Anzoategui. By the close of the century, when output hits about 500,000 barrels a day, the area under development will have expanded to a rectangle about 40 kilometers long by 20 kilometers wide, which represents a little more than 1 percent of the entire zone known as the Orinoco oil belt, which covers close to 55,000 square kilometers.

The proximity of the production operations areas, the enhancement plant and the future community to the towns of Temblador and Ciudad Guayana is going to permit maximum use of the facilities that these towns have to offer. In this connection, joint efforts are under way with the national and regional executive branches on infrastructure development plans in the town of Temblador. Furthermore, the proximity of the future installations to Ciudad Guayana will enable many employees to live there.

The development of support infrastructure for industrial activity must also provide for related spheres of activity, such as farming and livestock raising. In this regard, Lagoven is conducting studies to evaluate the area's farming and livestock raising potential and is considering the construction of a model farm to demonstrate that farming operations can be carried on side by side with oil production activities. A technical assistance service for local farmers and ranchers will later be established there.

Environmental Protection

Environmental studies have an extremely important place in planning for the DSMA Project. The studies must be completed before the start of the design stage so that the necessary steps can be taken to protect the ecosystem in southern Monagas and Anzoategui.

The environmental studies program of the DSMA Project, which Lagoven is pursuing in conjunction with the Ministry of thr Environment and Natural Resources, INTEVEP and many other national institutions and engineering firms, has as its overall objectives to minimize damage to the environment, to preserve the region's natural resources and to promote the development of conservationist attitudes.

One of the first studies conducted was the Regional Description of the DSMA Zone, the conclusions of which supported the site selection for the project's main installations. These conclusions also furnished advanced information on possible environmental damage and ways to avoid or minimize it, as well as furnishing basic information for the development of environmental guidelines. The regional description comprises an analysis of the physical and biological environment, the human environment, the transmission of power and the environment's sensitivity to the project.

As part of this regional description, the following specific studies will be completed in 1980-81: 1) Meteorology: this study is being conducted by INTEVEP, and four automatic meteorological facilities were acquired to perform it; 2) Aquatic and Land Biology: the La Salle Foundation is in charge of this; 3) Sensitivity of pine trees to industrial activity, also being conducted by the La Salle Foundation; 4) Agricultural productivity, coordinated by Simon Bolivar University.

In addition, Lagoven maintains relations and contacts with various conservation institutions, such as FUNDARBOL and FUDENA. Joint forestation projects are being promoted with the former. FUDENA, for its part, will formulate environmental education programs to inculcate in present and future project personnel the observance of practices to prevent environmental pollution in the performance of their duties.

The results of all the studies under way will serve as a basis for decision-making on the location of the industrial project's main installations and of infrastructure facilities and will also enable environmental standards to be drafted for the various operations and for the design of comprehensive conservation programs for the entire region.

The environmental research being conducted in southern Monagas and Anzoategui will be ongoing. Follow-up efforts will detect environmental disturbances early on and enable appropriate corrective measures to be developed in advance.

## Project Scheduling

Experience with projects of a similar scope to the DSMA indicates that at least 10 years are needed from the planning to the implementation phase. Therefore, in keeping with the guideline of producing 125,000 barrels a day of enhanced crude oil in this zone by the end of the decade, Lagoven began the preliminary planning of the project in mid-1978, which lasted about a year. This phase spelled out the objectives of and guidelines for planning efforts. The project planning proper has been under way since the middle of 1979 and is expected to conclude in late 1981. These efforts entail 1.1 million man-hours of planning studies on various activities and require a high level of specialization. An average of 250 persons will be engaged in these efforts over 2 years. In order to assimilate these planning efforts, a task force headed by Lagoven personnel has been formed, with technical assistance from specialized companies.

A master plan and a budget estimate will be out by the end of 1981; they are requirements for securing all approvals from both the parent enterprise and the National Executive Branch. Design work can then begin, and estimates are that the construction of the facilities will be completed by late 1988.

The oil industry definitely wants to employ as many Venezuelan engineering and construction companies as possible. The great length of the project will enable these Venezuelan firms to plan their long-range activities and growth.

## General Project Coordination

Because of the magnitude and complexity of the construction works and the logistics and interrelationship of the various phases of the project, overall project coordination is critical to prevent delays due to time lags.

Projects like this one are not common either in Venezuela or the rest of the world. Therefore, it stands to reason that the national oil industry does not have an organization to perform the coordination tasks that an ambitious project like this requires. Obviously, then, if the industry wants to make this project a success, it will have to hire a company to do the overall coordination, thus guaranteeing that all of the phases of the project will be completed on time.

After analyzing the resources and experience needed for the coordination efforts and inasmuch as no firm in the country meets these requirements, the conclusion was reached that a specialized foreign company will have to be employed (which from now on will be called the general project coordinator), on the condition that it form a partnership with one or several Venezuelan enterprises.

## Functions of the General Project Coordinator and Its Venezuelan Partners

The General Project Coordinator (CGE) will perform several important tasks, among which we would underscore the following:

It will coordinate the design drafting, the procurement and inspection of materials and equipment, and construction work on the various components of the project, in order to prevent time lags that could cause delays, with the resulting adverse impact on the Venezuelan economy, as analyzed previously.

It will also do the design work and procure the materials and equipment that Venezuelan firms cannot, as assigned to it by Lagoven.

It will act as Lagoven's representative in dealing with the various companies that Lagoven hires directly to construct the various specialized facilities. In this connection, it will exercise the control needed to guarantee the quality of project components.

It will train the personnel that the project requires. In performing this function, it will act in conjunction with Lagoven, INAPET [Petroleum and Petrochemical Training Institute] or other suitable domestic organizations.

In the event that a competitive bidding is called off, that bids cannot be taken or that a contractor fails to fulfill its construction contract, Lagoven will decide whether or not to award the contract to the CGE, in accordance, at all times, with the hiring regulations of the oil industry.

PDVSA and its affiliate, Lagoven, very much want the DSMA Project to be a major factor in the nation's development. Another goal is that the project will give rise to substantially strengthened Venezuelan engineering, construction, services, and materials and equipment manufacturing companies. The draft contract with the CGE contains provisions enabling Lagoven to insure that this basic objective is being met at all times.

## Qualifications of the General Project Coordinator

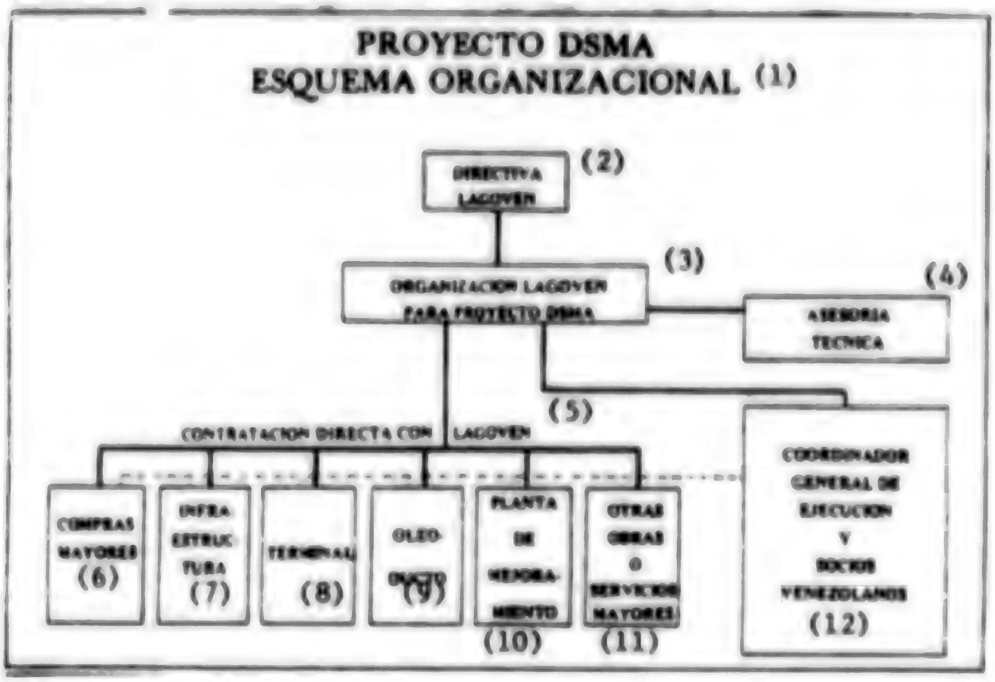
Given the nature of the DSMA Project and in view of the need to utilize the services of a General Project Coordinator, the success of the undertaking depends to a great extent on the company that is chosen to act in that capacity and on the terms of reference that are established for its activities.

The main qualification that a company must have is lengthy experience in administering oil projects of a similar magnitude. Companies with this kind of experience have extensive human resources well versed in multiple disciplines and techniques. Moreover, these companies have achieved a high level of technology in implementing programs to monitor the progress and costs of construction and in handling the interfaces between the components of complex projects, such as the DMSA Project, in which different activities will be undertaken simultaneously by different companies.

Project Organization

The chart below shows the management organization of the project. It reflects the fact that responsibility for directing the project, which cannot be delegated, falls entirely on Lagoven, beginning with its Board of Directors. Performing its functions directly under the board will be a high-level Lagoven organization consisting of some 80 Lagoven technicians, accounting auditors and specialists, with the cooperation of prominent Venezuelan public figures serving as advisers and with the support of a specialized firm that will provide know-how in the technical auditing of projects. The technical auditing consulting firm, to be selected in the future, must possess proven experience, inasmuch as in conjunction with Lagoven personnel it will direct and monitor on a permanent basis the activities that the CGE performs. The consulting firm is expected to assign some 100 technicians and specialists to the project, in addition to the follow-up and monitoring systems.

The Lagoven organization will directly sign all major contracts with third party enterprises for engineering services, materials and equipment procurement and construction. The management of most of these contracts will be delegated to the CGE.


PROYECTO DSMA
ESQUEMA ORGANIZACIONAL (1)
DIRECTIVA LAGOVEN (2)
ORGANIZACION LAGOVEN PARA PROYECTO DSMA (3)
ASESORIA TECNICA (4)
(5)
CONTRATACION DIRECTA CON LAGOVEN
COMPRAS MAYORES (6)
INFRA ESTRUC TURA (7)
TERMINAL (8)
OLEO DUCTO (9)
PLANTA DE MEJORA- MIENTO (10)
OTRAS OBRAS O SERVICIOS MAYORES (11)
COORDINADOR GENERAL DE EJECUCION Y SOCIOS VENEZOLANOS (12)

Key:

1. DSMA Project Organizational Chart
2. Lagoven Board of Directors
3. Lagoven Organization for DSMA Project
4. Technical Consultantship

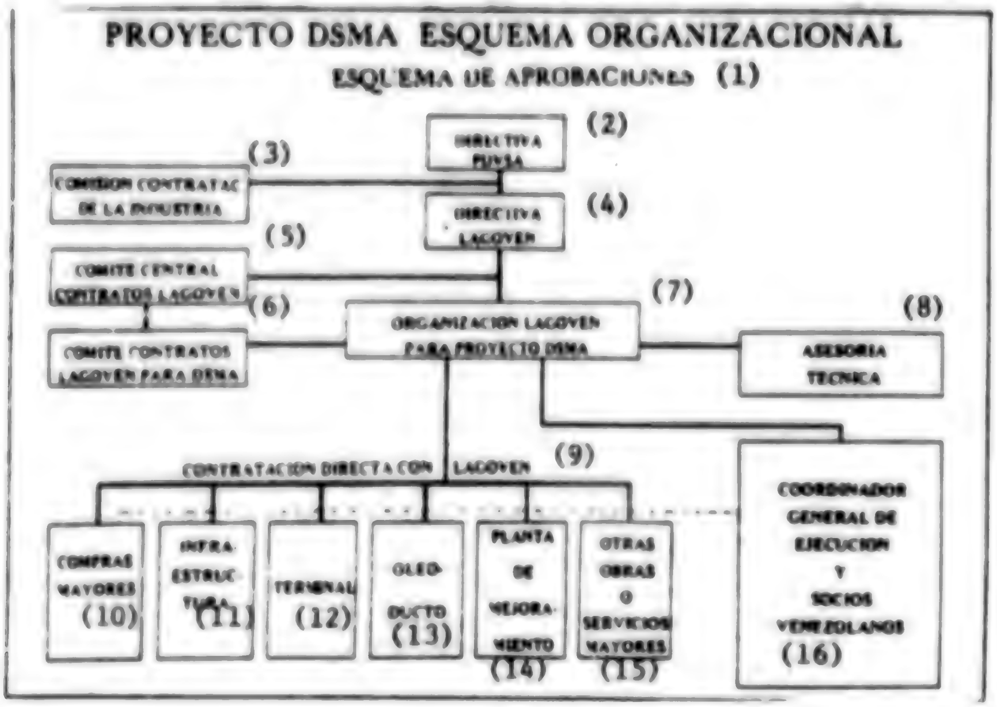
5. Direct contracting with Lagoven
6. Major purchases
7. Infrastructure
8. Terminal
9. Oil pipeline
10. Enhancement plant
11. Other major facilities or services
12. General Project Coordinator and Venezuelan partners

As mentioned before, the CGE will have to form partnerships with one or more Venezuelan enterprises.

There are several reasons for such a partnership, one of them being that, in addition to Lagoven, Venezuelan companies ought to be involved at the highest level along with the foreign firm in everything connected with the administering of projects of this magnitude and in dealing with all related problems, including the highest-level decisions. This will facilitate the transfer to the country of technology in running major projects and will insure, through the Venezuelan partners, that as many Venezuelan firms as possible are involved, which is one of the project's goals.

Authorization Chart

The diagram below shows the authorization network for the project, indicating the rank of the various committees that will monitor compliance with the standards of PDVSA and its affiliates for the administration of contracts. It bears noting that at no time will the CGE make decisions relating to contract awards.


PROYECTO DSMA ESQUEMA ORGANIZACIONAL
ESQUEMA DE APROBACIONES (1)
DIRECTIVA PDVSA (2)
COMISION CONTRATAC DE LA INDUSTRIA (3)
DIRECTIVA LAGOVEN (4)
COMITE CENTRAL CONTRATOS LAGOVEN (5)
COMITE CONTRATOS LAGOVEN PARA DSMA (6)
ORGANIZACION LAGOVEN PARA PROYECTO DSMA (7)
ASESORIA TECNICA (8)
CONTRATACION DIRECTA CON LAGOVEN (9)
COMPRAS MAYORES (10)
INFRA-ESTRUC-TURA (11)
TERMINAL (12)
OLEO-DUCTO (13)
PLANTA DE MEJORA-MIENTO (14)
OTRAS OBRAS O SERVICIOS MAYORES (15)
COORDINADOR GENERAL DE EJECUCION Y SOCIOS VENEZOLANOS (16)

Key:

1. DSMA Project Organizational Chart, Authorization Chart
2. PDVSA Board of Directors
3. Industry Hiring Commission
4. Lagoven Board of Directors
5. Lagoven Contracts Central Committee
6. Lagoven Contracts Committee for DSMA
7. Lagoven Organization for DSMA Project
8. Technical Consultantship
9. Direct contracting with Lagoven
10. Major purchases
11. Infrastructure
12. Terminal
13. Oil pipeline
14. Enhancement plant
15. Other major facilities or services
16. General Project Coordinator and Venezuelan partners

Draft Contract for the Services of a General Coordinator for the DSMA Project

The contract with the CGE is a contract for services rendered, not for the implementation of the project.

The type of contract that has been chosen is reimbursement of costs for services actually rendered, plus a fee based on said services. This is the usual formula for contracting these kinds of services.

There are two phases to the contract, and the construction works can be assigned entirely to third parties.

The first phase of the project, which will be undertaken mainly in 1981, comprises a minimal part of the entire project. This phase calls for the construction of road infrastructure for the zone, of the materials delivery dock and of a small community to support the start of Phase II, which entails the rest of the project. An important part of Phase I is the preparation of a detailed program for the execution of Phase II, which will begin once all necessary authorizations are in.

The draft contract stipulates that it is not mandatory to proceed with Phase II of the project once Phase I has been completed. The second phase is scheduled to begin in 1981 and will last about 7 years.

The CGE ought to be selected and hired as soon as possible. For some months now we have been seeing indications that enable us to predict that most of the major international contractors for the design and construction of oil complexes will soon be completely hired out for a long time to come. In light of the reconstruction of the oil facilities in the Middle East due to the current conflict there, the situation marked by the low availability of major contractors could get worse.

### Example of Work Apportionment: the Oil Pipeline

To illustrate how the various facilities will be undertaken, we will describe below how the oil pipeline will be built.

The pipeline specifications will be drawn up by the Lagoven team that is currently working on the project planning studies.

The basic construction design will be drawn up by domestic companies. Venezuelan companies will be given the initial chance to draw up the basic and detailed design of the installations, in other words, the pumping stations and related works. If Venezuelan companies are unable to do the work, it can be awarded, as a second option, to the CGE or another foreign firm.

As has been explained, the CGE will be in charge of coordinating and supervising the assembly and construction of the facilities. The assembly and construction proper will be handled by Venezuelan companies.

### Example of Work Apportionment: the Enhancement Installations

Another example of work apportionment we could cite is the construction of the enhancement installations. Once again the central issue is greater involvement of Venezuelan companies in all phases of activity.

It bears empahsizing that due to the nature and magnitude of this project, the CGE will have to play a significant role in the detailed design of the installations.

It is also expected that the services of the CGE or another qualified foreign company might have to be utilized in constructing some of the phases of these installations.

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## OLAVARRIA INTERVIEWS CALDERON ON STRATEGY IMPLICATIONS

Caracas RESUMEN in Spanish 3 May 81 pp 15-25

[Interview with Energy and Mines Minister Humberto Calderon Berti, by Jorge Olavarria; date and place not given]

[Text] Jorge Olavarria: President Luis Herrera's government has made a decision of extraordinary significance and importance to the nation's future: the complete exploration and exploitation of the Orinoco Oil Belt. In this conversation with the minister of energy and mines, Dr Humberto Calderon, we shall attempt to start with the most general and fundamental aspect: The decision to "go" with the Orinoco Oil Belt is a decision of a philosophical nature. In the final analysis, it relates to virtually axiomatic questions. There are two positions in this regard, and I put my question thusly: The first one is the consideration that the 50-odd years that Venezuela has spent as an oil-producing country have been wasted; that, with the wealth derived from oil, we Venezuelans have not acquired habits of work, discipline, economy, productivity or efficiency; that we have become accustomed to spending without producing, and that the only way of correcting this essentially vitiated situation is through poverty. In addition to this, it is thought that the oil within the country is assuming increasingly greater value, whereas when extracted and sold at current prices, paid for in money that is devalued and misspent on a useless bureaucracy or on unnecessary and costly projects, there is a suicidal, criminal and irresponsible liquidation of the nation's assets. That is the position which would tend to stop all oil exploration in Venezuela and simply let the present deposits continue to decline until they are barely sufficient for domestic consumption. That would be an "axiomatic" position. The other position is to claim: Venezuela needs oil. It needs to seek more oil in order to be able to accrue from what it produces all that is required for the expenses to which it is committed, to keep up its program for the creation of alternate sources to replace oil in the certain, inevitable, future eventuality of its disappearance. Therefore, it is necessary to search for oil. That is the second position.

In its report, the last Oil Assembly of Venezuela proved that, in reality, after years of stoppage in exploratory work, the results were obvious and undeniable: Venezuelan Petroleum's production capacity was decreasing and declining. The traditional deposits which produce light crude are yielding less and less, and it will be necessary to proceed to seek oil where it is plentiful. And the place where it is plentiful seems to be in the Orinoco Oil Belt. And it is plentiful in the form of heavy oil. I think that I have posed the fundamental "philosophical" problem quite clearly, and facing me is none other than the one responsible for the government's policy decision that has now been made to "go" with the Orinoco Oil Belt. I repeat, it is a decision of enormous historical significance, because the present government team whose term ends in 1984 will surely not benefit directly from its results. It is a highly significant decision which transcends that magic year 2000, and goes even further. Minister, you have the floor. Why has the government made the decision to go with the Orinoco Belt?

Humberto Calderon Berti: I believe that it is both important and feasible to dwell somewhat on an analysis of the two extreme positions that are held regarding oil in Venezuela's economic existence: the first, to the effect that, on account of oil, we have neglected other productive economic activities, and that has caused a series of damaging effects even to the very mental structure of Venezuelans; and, moreover, there are some who feel that it is necessary to liquidate the assets as soon as possible, as speedily as possible. Those are extreme positions. I would say that, as extreme positions, they both have flaws, and perhaps the truth lies at some point between the two extremes. I am among those who believe, and I have always thought in this way, that the oil in itself has not been what is harmful. What is harmful has been the poor use, the inefficient use that we have made of the oil resources. But the oil is not to blame for that. The blame for that lies with us, the Venezuelans themselves, who have not managed to use a resource given to us by nature to foster the country's growth from an economic, political and social standpoint in a rational manner. I would not claim that all the resources originating with oil have been squandered, because that would be an extreme position. The Venezuela of 1980 is not the Venezuela of 1940. I think that oil has made great contributions to the country's development. For example, let us take the end of the 1950's when access to education in Venezuela was limited. It was extremely difficult to obtain a slot in a high-school in Venezuela. It is not that the problem has been eliminated entirely, but the institutions of higher learning in Venezuela have multiplied, and intermediate education has multiplied, during the past 20 years; obviously, with the serious problem that the quality has been neglected owing to the quantity. But I would not say that the oil in itself has been detrimental to the country; rather, we have not been efficient in handling the resources from the hydrocarbons. It is basically a problem of efficiency, wherein education as a whole plays a decisive role, in my opinion.

Jorge Olavarria: In other words, you intend to justify the decision to go with the Belt with what has been done as a result of the oil? That is to say, you would make this decision contingent on a highly important political and structural reform, so as to prevent the bad things that have been done, and to stress the good things?

Humberto Calderon Berti: I would say that oil has given us Venezuelans of this generation, and future generations the opportunity to transform the country, but we have not managed to do it. I believe that Venezuela's oil history itself has played an important role in this. An oil industry in the hands of foreign capital, responding essentially to the interests of foreign capital, is not the same as a nationalized oil industry which should presumable respond to the country's general interests. How can this be demonstrated? Until 1976, Venezuela was a "financially controlled" country; we accrued funds as if "living on investment income." Nowadays, it is my essential view that the nationalized oil industry is faced with the challenge of integrating the oil industry into the country's development, inasmuch as I do not believe that, in the coming century, oil will have the same relative importance that oil has now. Why? Because, over the medium and long term, the high price of a barrel of oil will bring about the development of alternate energy sources that will compete with the hydrocarbons. I do not believe that oil will be completely replaced as an energy source; no, I believe that, as the oil decreases, its importance as an energy source will continue assuming greater significance, as raw material for petrochemical uses wherein the added value is greater. But there will be a transitional period in which oil will continue to be important; and, at the end of that transitional period, other energy sources will appear. So, on the basis of this, the proposition that we have attempted to apply is: We shall produce, on a rational level, the hydrocarbons to meet the requirements of the domestic market demand (which are certainly not very rational); but, on the other hand, we shall continue to provide the state with sufficient funds to enable it to undertake, hopefully in an efficient manner, the development programs which the country has been needing. There is a reason of a political nature, namely, that in Venezuela oil is the number one stabilizing factor for the democratic system. I find it very hard to believe that a democratic system such as the one that exists, with only the political parties, could exist in Venezuela if those political parties did not have a guarantee of sufficient financial income to permit a certain amount of economic stability or a healthy economic situation.

Jorge Olavarria: In other words, oil is subsidizing democracy?

Humberto Calderon Berti: I would say so. Yes, I have no doubt of it.

Jorge Olavarria: Don't you think that oil is a very high price for democracy?

Humberto Calderon Berti: If we consider the developing world (let us not discuss the industrialized countries which have diversified economies, but rather consider the status of the developing countries), how many developing countries have democracies? There are but few examples. And it is only those countries which have a relatively easy economic situation that have succeeded in stabilizing the democratic system. I would say that there is a direct relationship between economic stability, social stability and political stability.

Jorge Olavarria: Consider one thing, Mr Minister: there may be many Venezuelans who think that the price being paid for this hodgepodge known as democracy (which has a great many critics who claim that it is not a real democracy, and that it has many shortcomings and many evils), they may think that this price is somewhat high.

Humberto Calderon Berti: I believe in the democratic system.

Jorge Olavarria: I do too, but the fact is that our democratic system is stagnant.

Humberto Calderon Berti: Because it has not been renewed, because the country is proceeding much faster.

Jorge Olavarria: How much more oil is required for renewal? Do you think that renewal would be possible with a little poverty?

Humberto Calderon Berti? I would not call it a problem of how much more oil or how much less oil. It is a problem for those who comprise the country's political leadership. I think that we need to demand, I think that the country has the right to demand a renewal from its political leaders.

Jorge Olavarria: Let us go back to the beginning. So the decision to go with the Orinoco Oil Belt was made to preserve the democracy of the parties?

Humberto Calderon Berti: I would not call that the only reason. We have made a very careful analysis of the medium and long term energy situation in Venezuela.

Jorge Olavarria: In other words, the energy situation interpreted as a supplier of the energy consumed domestically, but also as a supplier of the treasury funds from oil that the state needs?

Humberto Calderon Berti: Definitely.

Jorge Olavarria: What results has the study brought? That if the state continues spending as it has been spending, the oil will not suffice?

Humberto Calderon Berti: That, among other things.

Jorge Olavarria: Do you mean to say that more oil must be extracted so that the state can continue to spend more, despite price increases?

Humberto Calderon Berti: No, the approach is not necessarily that. We have reviewed a series of medium and long term scenarios regarding what might happen to the Venezuelan energy situation; and we started from two extremes: one extreme indicating that Venezuela's economic growth will be very low, less than 1 percent of the gross national product. (Note: This is printed in its entirety in this issue of RESUMEN).

Jorge Olavarria: That is the situation, the economy is currently stagnant.

Humberto Calderon Berti: But that is not the historical trend. It is a growth of 2 or 3 percent per year. There might be a temporary stagnation, but that is not the historical trend. So, if that growth is maintained until the year 2000, it would mean that Venezuela would consume, from all energy sources, about 1.8 million barrels of equivalent oil [BPE]. (In other words, if we were to convert the coal, electricity, hydroelectricity, thermoelectricity and natural gas, all the energy sources, into equivalent liquid oil, it would amount to nearly 1.8 million barrels.)

Venezuela's entire energy consumption up until 1978 was 660,000 BPE; at the present time, Venezuela may be consuming 750,000 barrels per day of equivalent oil. The other scenario that we have reviewed is that, if Venezuela's economic growth is 3.5 percent per year, with a high rate of growth, a little above the historical trend, we would be consuming 3.9 million barrels of equivalent oil per day. That is to say, one can take any position between those two extremes that he pleases. But if one extrapolates the historical trend, it would amount to 2.6 million barrels. However, let us move on to the scenario involving liquid hydrocarbons alone, which is what bears a direct relationship to the Belt programs. If the economic growth trend is low, we shall consume 780,000 barrels of liquid oil originating from hydrocarbons per day, until the year 2000. If the growth trend is high, we could consume as much as 1.8 million barrels. In 1980, the consumption was 350,000 barrels of oil per day. In other words, if we extrapolate that 1980 growth with the historical trend, we might have a consumption of 1.5 million barrels on the domestic market.

Jorge Olavarria: Does that mean we are going to consume all the oil that we produce?

Humberto Calderon Berti: A substantial part of the oil that we produce.

Jorge Olavarria: That, indeed, is an argument: we must seek more oil because we are going to consume all that we have....

Humberto Calderon Berti: That is an argument, it is an argument which....

Jorge Olavarria: In other words, as in the case of Romania....

Humberto Calderon Berti: And many others, Colombia and the United States....

Jorge Olavarria: Romania was a major oil country; Colombia never has been one.

Humberto Calderon Berti: It was self-sufficient for a great many years. The United States was self-sufficient and an exporter, and it has become an importer of oil. Let us review the situation on the basis of what we shall be and are capable of producing in Venezuela. At the present time, Venezuela's production potential is 2.45 million barrels. That is the amount of oil that we could produce at the maximum efficient capacity of our deposits. We are not producing that; we are producing an average of 2.2 million barrels, and we have a cushion of 250,000 barrels per day. What does the historical trend for our traditional basins indicate? That this potential will be possible to maintain in those traditional oil development areas for the rest of this constitutional period, until 1984; but the time will come when those deposits become aged, and they are becoming aged day by day. Then they will start to decline, there will be a more marked decline. The Venezuelan deposits decline about 20 percent per year, in a natural way. The fact is that, through the drilling of development wells, the reconditioning of wells, the service on wells, etc., we have managed to reduce that natural decline from 20 percent to a real decline of between 6 and 7 percent. But obviously, day by day, the effort that must be made to maintain that potential is greater. We have to drill more, we have to devise more secondary recovery projects, we have to recondition more wells, we have to clean them. For example, in 1980 we drilled 1,300 wells in Venezuela, 350 of which were wildcat wells and 1,000 development wells. In their best periods, the concession holding oil companies drilled 500 wells, and why? Because the deposits are older now. So, the scenario that we have is that, by the year 2000 our traditional basins will be producing between 1 and 1.5 million barrels. If we compare the demand, the increased demand on the domestic market, we might have a scenario wherein we were self-sufficient, but we might also have a scenario wherein we would have to import oil. In the event of slow economic growth for Venezuela alone, we would have about 200,000 or 500,000 barrels to export; that is the situation. The policy decision that we have made is to go with the Belt. We have made the decision to maintain Venezuela as an oil exporting country.

Jorge Olavarria: The quite predictable alternative, in the event that the decision were made for Venezuela not to continue being an oil producing country, is a catastrophic one. Venezuela is not a country that could maintain this standard of living and this rate of public spending without the oil revenue. We have not developed alternative or substitute sources.

Humberto Calderon Berti: This is a "fiscal year" extended for 20 years. No one here in Venezuela thinks in terms of 20 years. Here, those who want to be presidential candidates think about 20 years, but the rest do not. When mention is made of "5 years" and the Plan of the Nation, people are already skeptical, and do not believe in it. Venezuela is a country where one thinks in immediate terms, from today to tomorrow; I am living today, and I shall see whether I live tomorrow; I live for the day. We have made the first fiscal year, I believe, the first fiscal year made in this country from a long-term perspective. We have the guarantee that, during President Herrera's constitutional term, we shall keep the production potential at 2.4 million barrels. We have the guarantee that we should not have any problem with production levels, that we should not have any fiscal revenue problems, that we should not have any problems with the balance of payments. The decision to go with the Belt transcends our term.

Jorge Olavarria: If the state continues to spend as it is spending, it will have problems with the balance of payments.

Humberto Calderon Berti: But not over the short term; a series of corrective measures is being applied.

Jorge Olavarria: The Ayatollah Khomeini has provided us with the corrective measures.

Humberto Calderon Berti: No, a series of corrective measures is being applied. I shall not tell you that the situation is satisfactory for everyone at present, no. I believe that we still have a group of bodies in the state, not to mention cancers, comprising a kind of spendthrift element. There is a group of state agencies making off with billions of bolivares.

Jorge Olavarria: One of the most noteworthy aspects of this report to the Oil Assembly of Venezuela is that mention is made here of the Venezuelan Petroleum oil investment figures, citing 9.76 billion, and stating that it was 6.516 billion last year. This seems to be a sizable amount, as in fact it is; but when one considers the fact that CORPOMERCADEO [Marketing Corporation] alone owes 12 billion bolivares, and that, in order to keep the oil industry alive, 9 billion bolivares is being invested, there is a colossal distortion here. There is a group of firms which are real drains, and I would say that the problem does not lie solely in the central administration; in my view, the problem lies in the state companies and the decentralized entities. When one observes such things, when one hears the oil men discussing and handling large sums, one realizes how those who are not responsible for producing the money on which that monster called the "Venezuelan state" lives, are handling the billions. You note public statements made with the greatest of ease and self-confidence by politicians who, for example, talk about the BANDAGRO[Agricultural and Livestock Development Bank] scandal, and the FUNDALARA [Lara Foundation] scandal. In other words, all that we are talking about here is a sum of nearly 15 billion bolivares. So there is no Belt that would suffice.

Humberto Calderon Berti: I do not think that the justification for going with the Belt is the state of irregularity in which the decentralized entities have been kept for a great many years. I have stated on many occasions that, if immediate corrective measures are not applied to a group of state companies and autonomous institutions, over the longer term there will be no financial resources supplied by oil which can withstand that situation....it is impossible. I am absolutely sure about that. But this has not caused us to lose the perspective on the other matter. I think that we can find a model wherein oil really feeds the economy in a sound manner, and that it is not the one filling all the gaps which exist in the central administration and the decentralized administration.

Petrochemicals

Jorge Olavarria: There is an example wherein I think it would be helpful if you were to explain to me how it happened: For many years, the great invalid of the Venezuelan state companies was something called the "Venezuelan Petrochemical Institute." I was chairman of the Petrochemical Subcommittee of the National Congress Chamber of Deputies, and started to study somewhat the catastrophe that it represented. I reached the conclusion that there was no remedy for it, that it simply had to be closed. When the Venezuelan Petrochemical Institute was transferred to Venezuelan Petroleum, I was among those who thought that this sick entity might make Venezuelan Petroleum sick. Quite the contrary has happened. Tell us a little about the story of the Petrochemical entity.

Humberto Calderon Berti: In 1975, I gave a lecture to the Venezuelan Executives Association, and proposed as a solution (I would say that it was perhaps the only solution for the Venezuelan Petrochemical Institute) that it be absorbed by the oil industry; that is, once the oil industry was nationalized. At that time, we were preparing everything for nationalization, during the final phase of the decision to nationalize. Luckily for me, it was done in that way. The oil industry and the petrochemical industry are two different things; they are two different activities, and even have different mentalities. The oil man and the petrochemist have different mentalities. But there is no state company in Venezuela with a greater technical managerial capacity than the Venzuelan oil industry. It occurred to me, and that is what the previous administration did, that if the oil industry took over the petrochemical entity, and that petrochemical entity could be kept dissociated from partisan political maneuvering, if that petrochemical industry could be kept working full time, recovering its plants and putting the plants into service, that industry could be recovered. And that is what we have observed during the past 2 years. For the first time in the history of Venezuela, in over 25 years of petrochemical history, all the country's petrochemical plants are in operation. For the first time in history, in 1978 622,000 tons of general products were achieved. In 2 years, we raised the production from 622,000 to 1.6 million tons; it was doubled. In 1978, the Petrochemical entity's losses were 700 million bolivares; this year they were 250 million. We are not yet satisifed. We believe that we can recover it. What have we done? What are the merits of the Venezuelan oil policy directors in the petrochemical area? Giving support to the people working in it! Protecting them from those outside the country! Allowing them to work without shocks. Because the main problem was that it had been intensely politicized, with administrative corruption and with inefficiency in general. There is no industry in the world, of any kind, that can pay dividends without producing. And the petrochemical industry was not producing; it had nothing to sell. So now we have told the people: Don't be concerned about the newspapers; don't be concerned about public relations. Work, expend all your effort on working. If we can be given recognition for anything in the future, it is that we have given political protection and political support to the Venezuelans in the petrochemical industry, who have succeeded in making a substantial improvement in the state of the industry. Gradually, people are not expressing an interest in them; at best, the country does not even know who the board members of the Venezuelan petrochemical industry are. Why? Because they are not interested in being at cocktail parties, they are not on television programs, they are not in the newspapers; rather, they are interested in work. And that is what we have been seeking. Those results that have been accrued, which have been improving substantially,do not satisfy us yet. I believe that the effort must be continued, and the losses must be reduced and profits produced.

Now that effort must be continued. We are lending it all our support, but the results that are being accrued make us Venezuelans optimistic. We are not only producing income in Venezuelan Petroleum, in an industry which we received healthy and which we have kept healthy, with efficiency and responsibility in its management, but we have also proven that even the company which was a nightmare to Venezuelans (because talking about petrochemicals in Venezuela is a real nightmare) can be recovered with work, dedication, integrity and responsibility. And I believe in the ability of Venezuelans to manage things. However, they must be given a proper work habitat. No state company can operate efficiently if the manager of the plants or the maintenance chief is a member of a party and achieved that position because of his status as a political militant. No, there is no need, there is no need for a plant chief to be a member of a political party. If he is, it doesn't matter; but it cannot be a requisite. That is not the case in the state companies; every time there is a change of government, there is a general "shake-up" not only among the company executives, but also among the intermediate managerial staffs and even among the technical staffs. Now companies which are constantly subjected to changes cannot operate efficiently. There must be clearcut guidelines and clearcut policies. During the election campaign, President Herrera remarked: "We shall lend continuity to the industry's programs," and we have lent them continuity, contrary to many suggestions and many opinions of people who are even very close to us. We lent continuity to the changes in the refining standards; and we were told to make a change, and to give them a reorientation. The only change that is now in effect is that in Cardon, and every 3 months the investment that we made there is paid back. The change in standard for the Amuay refinery, which cost 1.4 billion bolivares....

## The Change in the Refining Standard

Jorge Olavarria: Why not explain to us what the "change in standard" was?

Humberto Calderon Berti: It is simply that we are now producing more light products and less residual fuel; so we are obtaining more profits from the oil, because the light product, the medium distillate, is worth more on the international market than residual fuel. I would like to recall something. In 1968, when the Amuay sweetening plant was built, there was tremendous criticism of that investment. Today, I think that the investment there is paid back every month. If we had not had the Falcon sweetening plants, we would be producing residual fuel with a high sulfur content, which has a far lower price on the international market than residual fuel with a low sulfur content. We have now passed that test. The people who criticized Amuay have forgotten their criticism. Amuay is there working and producing tremendous profits. The question of the changes in the refining standard came later. They are operating now, producing profits that we ourselves had not estimated. And now it is the same people who are criticizing the decision to go with the Belt. In this regard, I think that what the country must have is confidence in those who are running its oil business. When the day comes that there are more people outside the oil industry capable of running the industry than there are inside the industry, we shall have to yield to those who are outside. But that is not the case today. So, in my opinion, the country should not only be proud of its oil leadership, but also confident in it; because they are the ones who know the business. Very few oil producing countries in the world have an oil "elite" such as that in Venezuela. We have not only the high-ranking executives, but also the middle management and the professionals and technicians. So, we cannot run that industry with criteria that change at every turn; rather, there must be continuity in the programs, there must be progressiveness, action and continuity, because this is not an industry that can be subjected to forward and backward moves.

Jorge Olavarria: But, to return to the beginning (because we have been delightfully diverted), how would you summarize the policy decision to go with the Orinoco Oil Belt, very briefly?

Humberto Calderon Berti: If Venezuela is determined to continue being an oil producing country, because it has the resources in sufficient amounts and because it needs these resources in order to promote its program and carry forward its development, if that is the context, then the decision is that we must go with the Belt.

Jorge Olavarria: Is there oil in the Belt?

Humberto Calderon Berti: If the results from these past 3 years of an exploratory campaign in the platform had been substantially different from the results that we accrued, the decision on the Belt would not have been made at present.

Jorge Olavarria: What are those results?

Humberto Calderon Berti: Among other things, for example, in 1972 the La Vela inlet was discovered. At first, estimates of 300 million barrels of recoverable reserves were made in the first exploratory phase, during the first campaign that took place in 1972-73. Now we have carried out the second part of the campaign, and deposits that we thought contained 300 million barrels have been reduced to 50 million barrels, with the latest results; that is what we have. Then we went to Golfo Triste, facing Puerto Cabello. In Tucacas, we drilled two wells, and we did not find any oil. We went to Tuy-Cariaco, facing Barcelona, around La Tortuga. There we found samples of oil, signs of oil, wells which have produced, but we found no commercial accumulation. The fact that there are signs of oil, wells that have produced 800 barrels, and the production is falling, with 400 barrels for another, with the production dropping, is a positive indicator. It indicates that the basin is capable of producing oil. But we must continue in order to locate commercial accumulations. Then we went north of Paria and southeast of Margarita; there we discovered really large gas deposits, which indicate to us that we are witnessing perhaps the largest gas-bearing basin in the country. We shall continue those programs; we are continuing them with the challenge of evaluating and learning the size of the resources, and what resources we have in that area. The exploratory program that we are carrying out on the Orinoco delta continental shelf has not brought us any results. So, with that situation, the initial estimate that we had made, namely, that the platform could contribute half a million barrels to us by the end of the century, we must seek an area where there is no exploratory risk, where we have assurance that we can produce, with the sole disadvantage that the production is difficult, and that the maturing time for the investments is very long, because the productivity from the wells has been low thus far. I think that it is far more suited to the nation's interests to produce heavy oil, which is what we have most of, and to conserve our medium and light oils, which are what we have least of. The criterion that we have been using, whereby for each barrel of heavy oil we are producing two and even three barrels of light and medium oil, does not make sense. Logic would indicate, if you have a large amount of heavy oil, you should try to conserve the light and medium oil, which is what we have least of, and so we would try to compensate for that reduction through the incorporation of heavy oil. From a geopolitical standpoint, from a strategic standpoint, it would be desirable for us to have a production potential of 2.8 million barrels by the end of the century. This does not mean that we are advocating that 2.8 million barrels be produced by the end of the century. No, it means that the country could be producing its same 2.2 million barrels, or possibly less; but that we have a cushion, which gives us a guarantee and which, moreover, confers on us a geopolitical strategic importance that we cannot underestimate and that is very important in our opinion. Not everyone may have the same assessment of this prospect. I would say that the predominant opinion among the Venezuelan population is that of those who want the resources originating from oil to be used rationally, the economic situation to be improved, public spending to be curbed and the waste on the part of certain state companies to be checked.

## Nuances and Opinions

But they want political stability, and they want the survival of the democratic system. I would not claim that all sectors of national life have that view. Obviously, there are interests of a different type. There are some who are not concerned about Venezuela's being economically stable, about Venezuela's being socially stable, or about its being politically stable; because their opportunities would improve substantilly if Venezuela had different conditions. Now I believe that this must be understood, and it must be understood at the outset.

Jorge Olavarria: The statement that you have just made seems to have a name and a surname; because in a letter with a very clearcut addressee, it seems to say: "Communist Party of Venezuela."

Humberto Calderon Berti: I would call it the sectors which do not believe in the democratic system, the insurrectionist groups.

Jorge Olavarria: But, besides that, don't you think that there could be Venezuelans who, in good faith, think that, despite their religious belief in the goodness of the democratic system, or of a better democratic system, Venezuelans are not going to learn to administer well, and are not going to learn not to waste money, unless they have poverty; and the only way of maintaining that poverty, of creating that poverty, is by keeping the oil underground? That was the view of Juan Pablo Perez Alfonzo.

Humberto Calderon Berti: I do not want any confusion to exist in this regard. I am not giving signals that all those who are opposed to the Belt programs or to the policy that we have devised with respect to the Belt are extremists or insurrectionists;far from it. No, that would be extremely harsh and impertinent on my part.

I think that there are many people who are critical from the standpoint, or from that angle, the angle of "waste," who are not incorrect in certain aspects of their arguments; but I don't think that this can be attributed to oil. I don't believe that it is an oil problem. It cannot be blamed on the country's oil administrators. The problem must be blamed on those who handle the funds coming from the oil, not those who produce it. The former have not learned to do their job. But the oil industry is proving to us that we Venezuelans are, indeed, capable of managing our affairs efficiently, when we strive and want to do so, and also, I think, when we are aware of what it would mean to the country if the oil industry were not run well; because that too is a major element, involving a major judgment. Those who run the oil industry are not Swedes, they are not from northern Europe; no, they are little Venezuelans from the Andes, Margarita, Maracaibo and the Oriente section of the country, who have learned to do things in an efficient manner, with integrity and responsibility. That is all. And where the people's work is evaluated, where people are not subjected to a constant harassment by political issues, where they are not threatened because they think one way or another. No, we are not concerned about the way the people in the oil industry think. There are some policy guidelines which emanate from the agency institutionally responsible for the sector, which is the Ministry of Energy and Mines, and the policy is carried out by others, those who must engage in running the industry through Venezuelan Petroleum and the operating companies. But we do not ask anyone for political credentials, to ascertain whether or not those policy guidelines are going to be implemented for us. That is not of concern to us, the oil policy directors, either; what does concern us is the fulfillment of the goals. So, when we hold our stockholders meetings, that is, the minister of energy and mines, representing all the Venezuelan stockholders, which comprise the entire population, holds them, what we want to find out is simply how those policy guidelines were implemented, and how the plans and programs devised to fulfill the policy guidelines were implemented, regardless of the ideological, religious or political position of the people who are running the industry.

The Belt

Jorge Olavarria: We have already discussed the philosophy in this matter sufficiently. Now the decision to go with the Belt has been made. Let us proceed to the Belt. It represents some very large investments; it represents a series of economic problems and internal relations among the country's productive and professional elements which are highly complex. It represents ecological problems, and problems of urban planning and territorial planning. It entails a series of decisions wherein it would be desirable not to repeat Venezuela's unfortunate experience of the period from the 1920's to the 1930's, of the country which changed from that rural, backward Venezuela of 1920 into the leading oil producer and exporter in the world in 1930; with oil camps isolated from the rest of the country, and with an oil industry isolated from the rest of the country, which only benefited the foreign investors, which was excluded from the rest of the country, which remained almost stagnant. Very serious urban distortions were created as well, the results of which we are observing today, in the towns that are so blighted, so poorly designed, so poorly conceived and so poorly constructed on the Bolivar District coast in the state of Zulia, for example, to cite just one instance; not to mention those "ghost towns", the abandoned oil camps. Let us start over again, and not make the mistakes which were made when Venezuela was a feudal country and a semicolonial country. We are no longer such, or at least we are trying not to be. And in that connection there is such a vast infinity of problems that it is impossible to discuss them all in one conversation. Let us begin at the beginning, or at least with what is most obvious. One of the operating companies, LAGOVEN, has made the decision to offer a contract, an engineering one, I believe, for coordination of engineering, to a very prominent engineering firm in the world, called Lummus. In this connection, because there was talk about the disadvantages or advantages represented by another one of these huge companies, Bechtel, which certainly has among its present and past board members some individuals very closely associated with the United States Government, what can you tell us about this?

Humberto Calderon Berti: Let us give an answer in two different periods. As for the first part of the question, and your comments, which seem remarkably interesting to me, the Belt programs offer Venezuela, the Venezuelan oil industry, the opportunity to carry out the integration of the oil industry into the country's development plans. As I said previously, the industry was an industry toward which the country had an attitude of being financially controlled and living on investment income. We believe that the oil programs, not only those for the Belt, but all the oil programs to be developed in the future, will be of great dimensions. We have said that, during the next 5 years, the period when the Sixth Plan of the Nation will be in effect, the industry will invest 93 billion bolivares. Only a part of that will be in the Belt. We shall have major investment programs in other oil producing zones of the country. So, what is confronting us? We are confronted with a challenge and a tremendous opportunity! What is the challenge? That we cannot continue to view the industry, we cannot continue to consider the industry as a generator of government revenue, but rather as a genuine agent of national development. And how can that be achieved? How can that materialize in real substance? For example, in the first place we can achieve the incorporation of Venezuelan engineering into all aspects of the design of industrial plants. In Venezuela, the first dams, the first water sources were created by the foreign companies. Gradually, a better mastery of civil engineering was gained in the country. Today, no one would think of hiring foreign firms to build highways, to construct buildings or hospitals, or to build bridges. We in Venezuela do that. Not only is there design, but construction as well, in Venezuela; and there is a complete mastery of the technology of civil engineering. Civil engineering has been developed to a very high degree in Venezuela. This could happen in the case of the mastery of the technology of industrial construction.

There was a large amount of foreign participation in SIDOR's [Orinoco Iron and Steelworks] Fourth Plan; and there has been a large amount of participation by the foreign component in virtually all the major industrial plants built in Venezuela during the past few years. Never in the history of Venezuela has there been such a large demand and high rate of industrial construction in the past. For example, in the oil industry, the last major project before the changes in the refining standard that we are making now, was the Amuay sweetening plant, in 1968. During a certain period, the engineering firms engaged in that type of activity increased, employing as many as 50 or 100 engineers; but upon termination they were left with 8 or 10 engineers. Hence,a certain type of engineering can be carried out by about 20 multinational firms, and no national one.

But I believe that the Venezuelan oil industry is now faced with that challenge, and must attempt to bring even more Venezuelans into these projects. It has this opportunity if we insist upon having an intensive participation by Venezuelan technology in the design of the industrial plants, which would not be applied to the oil industry alone, but could also be applied to other industrial sectors in the country. When we are about to build an electrical plant, why do we have to call upon a foreign firm?

Jorge Olavarria: The fact is that Venezuela is a country that has been an oil producing country for 50 years; and yet, for the first serious and important project for oil development that it has ever had to undertake, to nationalize its industry, it has to resort to a foreign engineering company to advise it. In other words, there is no Venezuelan Lummus in Indonesia; nor is there a Venezuelan Bechtel in Algeria.

Humberto Calderon Berti: But don't forget that the Venezuelan oil industry was not so Venezuelan. It was a concessionary industry. So it was of no concern to the Creole people in New York, or the Shell people in London, it was not part of their concern that there be participation by Venezuelan engineering. In other words, in seeking, through my main offices abroad, not only the technology, not only the engineering, but also the purchase of materials and equipment, this was done outside. An American company was not interested in Venezuelan engineering, nor Venezuelan materials and equipment. Nowadays, when the oil industry is nationalized, there must be a totally different concept, and I believe that this is an opportunity which is offered.

Jorge Olavarria: Do you view the Orinoco Oil Belt as the great impetus for a truly large-scale industrial activity in the country?

Humberto Calderon Berti: I would say that it is basic, provided we who are running the oil industry are aware that it is a goal which must be attained.

Jorge Olavarria: Look, Minister, that has been tried; there is over in Puerto Cabello a Venezuelan oil tanker which cost three times more than it would have cost elsewhere. There is another example, not a very good one, the example of the SIDOR pipes.

Humberto Calderon Berti: But you cannot move from 25-foot barges to 60,000-ton tankers. The intermediate stages have to be traversed. That is why, among other things, we sought a foreign company which had experience in the coordination and supervision of Mega projects, to become associated with a Venezuelan firm, so that progress could be made, not in the execution of the programs, but rather in their coordination. We have stated: in the Belt programs, Venezuelan engineering, Venezuelan materials and equipment and Venezuelan contractors have top priority. So there will be provisions in the contracts. The coordinating firm that LAGOVEN has just selected, Lummus, will not construct in the Belt, it will coordinate and supervise. A followup will be made for 8 or 10 years of the programs that are to be carried out jointly with a Venezuelan company, with Venezuelan engineering.

They bear a very great responsibility; and it will be the future that will demand of Venezuelans that they participate as partners with the foreign company, their participation; because they will be responsible for the implementation of this and, of course, the people managing the LAGOVEN company project as well.

Jorge Olavarria: Have the engineer-man-hours required for all this been gaged, in comparison with the engineers that Venezuela possesses? Has that count been taken? I don't know how many engineers there are in Venezuela, whether there are 5,000 engineers in Venezuela, or a multiplication of that figure....

Humberto Calderon Berti: No, there are 30,000 engineers....

Jorge Olavarria: All right, 30,000 engineers in Venezuela, 30,000 Venezuelan engineers multiplied by 8 work hours per day, for the 200-odd days of the work year. That gives so many engineer-man-hours. Do we have that here?

Humberto Calderon Berti: Let us take one thing at a time. The first phase of the Belt project related to the planning of the project. Then come the phases of the execution of the project in the southern part of the state of Monagas. There was a first pre-planning phase which we have already completed, which was carried out by the LAGOVEN people. Then there is a phase that we must complete by the end of 1981, namely, the planning phase. We are in that phase now; this planning phase is being carried out as follows: 25 percent by the LAGOVEN company, 25 percent by native consultants and 50 percent by a foreign firm. So, the planning phases have been distributed in that way. By the end of this year of 1981, when we finish the planning phase, we shall have all the information with which to ascertain how many man-hours per activity and per project within the general project, how many we shall require and the amount of funds we shall require. For this reason, I do not want to discuss figures right now.

Jorge Olavarria: Now, apart from the oil activity per se in the Belt, there is a group of activities that we shall term "satellite" or "marginal" ones, involving the supply of equipment, goods, all sorts of things ranging from concrete and cement, pipes and steel bars to pancakes and hardwood, from a little more sophisticated oil rigs to plumbers. Houston has become the oil capital of the world for that very reason, because it has developed an equipment industry for the oil industry, which I would have liked to see in Caripito or Cabimas.

### The Great Challenge to Engineering

Humberto Calderon Berti: I have thought a great deal about that, and we have made some comments in the past. The Venezuelan industrial policy was deeply rooted in, and greatly oriented toward the automotive industry. When one reviews the state of the Venezuelan oil industry, what that means from the standpoint of the consumption of materials and equipment, and from the standpoint of being a captive market, because it is located within the national territory, one finds some contradictions, one finds some things that cannot be explained; because Venezuela is, after the United States and after the Soviet Union, the country with the most complex oil industry. I shall simply cite a few figures so as to give us an idea of the magnitude: For example, we in Venezuela have drilled 30,000 wells; whereas in Saudi Arabia, Iran or any major producing country of the Middle East, not even 1,000 wells have been drilled. In Saudi Arabia, 1,000 wells have not been drilled; in Iran, 1,000 wells have not been drilled; in Iraq, 1,000 wells have not been drilled. What is the situation? When we note the number of wells that we have drilled, when we say that we have 12 refineries, that we have over 60 water injection plants, plus 60 gas injection plants, that we have dozens of steam injection plants, and that we shall have a great many in the Oil Belt, that we have over 40,000 kilometers of main pipelines and secondary branches, which could go around the country, all this represents an extraordinary demand from the standpoint of materials and equipment.

Jorge Olavarria: But this has not been reflected...there is no pipe industry in Venezuela, nor a gas injector plant, nor anything of the sort!

Humberto Calderon Berti: There is no solid metal-working industry peripheral to the oil industry, nor one that counts on the oil market, or has counted on the oil market, for its development. Why? I think that we must revert back to history a little also; the oil companies did not place any emphasis on this. Not only do we have a clearcut policy line in that regard, but also a commitment to Venezuelan industrialists, to the effect that the oil programs to be developed in the future will have to give it priority.

Jorge Olavarria: That is where the doubt comes in! Because Venezuelan industrialists have experienced too many years: on the one hand, they have been penalized by the contradictions and absurdities of the governments' industrial policies, and, on the other, they have too bad a habit of moratoriums on payments, easy credit, protectionism, lack of competition, very poor quality in the products that they put out, and almost no competitiveness of their own products on international markets. Well, the examples are obvious; look at the Venezuelan automotive industry that you have mentioned.

Humberto Calderon Berti: We have had a satisfactory experience from this standpoint. In 1975, which was the last year before nationalization, nearly 400 million bolivares worth of materials and equipment of native manufacture were purchased here in Venezuela.

Jorge Olavarria: How much was purchased abroad?

Humberto Calderon Berti: The figure abroad was twice that here in Venezuela. In 1980, 6.5 billion bolivares worth of materials and equipment was purchased by the oil industry, 2.7 billion of which was for native manufactures. The percentage has improved, though not wholly what would be desirable. But we are adopting a series of very concrete measures. For example, about 6 months ago, the Council for the Development of the Capital Goods Industry was newly created. In fact, I am carrying in my briefcase a report that we shall consider tomorrow at the meeting of the Council, in which a series of concrete recommendations has been made to establish a policy regarding the development of the capital goods industry in Venezuela. We have been working on this with the participation of several ministers and the Executive Secretary of that Council. It operates with financing from Venezuelan Petroleum. This goes to show that we are concerned that this occur. We believe that the oil industry could be a highly important market, owing to its requirements for materials in the future and the size of its investments. We have had some interesting experience in this regard: During 1977, in INTEVEP [Venezuelan Institute of Petroleum Technology], when I was with INTEVEP, we began a program for advising Venezuelan companies which were manufacturing materials and equipment for the oil industry, for advising them in the area of quality control. We inspected dozens of firms, and substantial improvements were achieved. For example, here in Venezuela top quality valves are being manufactured at prices competitive with those on the international market, and that firm belongs to a Venezuelan. And many materials and types of equipment are being manufactured, improving their quality merely with the advice that has been given to the firms; and the oil industry is purchasing them now. So that is another possibility. The third matter that I consider important to cite, one that you mentioned in your comments, is the fact that the industry is faced with the challenge of making oil development in keeping with the interests of regional development and the communities wherein the development is taking place. We cannot repeat the unfortunate experience of the oil camps replete with all services, many services: water, light, sewers, well-being in general, quality of life, and have beside them oil communities with underprivileged people, with education problems, services problems, health problems, etc. That cannot be; at best, that was a thing of the past. But the oil industry's responsibility now consists of preventing this from being repeated. For example, we have done away with the concept of the oil camp. No more oil camps will be created in Venezuela in the future. The people must be integrated into their communities, so that they may be concerned with the problems. I am sure that if the Venezuelan engineers who are currently living in the oil camps had to live in El Tigre, had to live in Lagunillas or had to live in Ciudad Ojeda, they would be fighting to make the public entities give them good services, not only for their own benefit, but that of all the communities. I lived in an oil camp. The vast majority of the people who lived in the oil camps (this is changing considerably) were not concerned with the problems that existed in the communities adjoining them. So you had wealth opposed to poverty. That cannot be. But this is not a theory, this is not a philosophy: there are concrete facts. On 23 March, in the Oil Assembly of Venezuela, we just approved an initial appropriation of 500 million bolivares for urban territorial improvement plans, and plans for territorial reorganization on the eastern shore of Lake Maracaibo. It is not that we are attempting to replace the entities of the centralized administration nor the entities of the decentralized administration, in the responsibilities that are inherent in them. No, but the oil industry can make the interest of the industry itself coexist with the interests of the communities. Why? Because there is the coincidence that, on the eastern short of Lake Maracaibo there are over 5 billion barrels of recoverable oil in the subsoil, which we must use with the development of the technology that we have achieved, a steam injection to recover that oil that could be worth several hundred million bolivares once it can be extracted from the subsoil. So, we shall have to make some reassignments of people. But we shall also use the opportunity to carry out some projects financed by the industry and not executed by the industry; rather, executed by a comapny that is subordinate to INAVI [National Housing Institute] and CORPOZULIA [Zulia Corporation], called PRODUZCA; so that several programs that would be of collective benefit to that part of the eastern shore of the lake can be carried out. A coastal boulevard will be built; a museum will be built; the basic core of the university will be built; a recreational town will be built; and the urban roads of those communities will be revamped.

Jorge Olavarria: All that with 500 million?

Humberto Calderon Berti: We shall accomplish all that with an initial contribution of 500 million bolivares. Remember that, since we are used to talking about multimillion figures, we think that all the country's problems can be solved with 4 or 5 billion bolivares. But the problems of the interior communities can be solved with far less than that amount. They can be solved with a little willingness. But that same situation has cropped up in the case of the Oil Belt. However, in the case of the Oil Belt, we are in an advantageous situation, in my opinion, as compared with what happened in Zulia. Because the situation in Zulia is a fait accompli, which we shall attempt to remedy. The situation in the Belt is completely controllable. And what are we going to do to control it? Last year, in June 1980, an agreement was signed between Venezuelan Petroleum and the Ministry of Environment to make possible a plan for the territorial regulation of the Oil Belt, to prevent disorder, to prevent the occurrence of a disorderly territorial development that would bring us serious problems in the future. This is in progress, and it will be completed shortly.

Jorge Olavarria: That was attempted in the case of Ciudad Guayana, and yet the disorder was created....

Humberto Calderon Berti: We have given up the initial idea of creating a large town in the Oil Belt.

Jorge Olavarria: The oil industry does not have those problems, because it does not employ large masses of the population. The problem is relatively reduced. It has a serious problem from the standpoint that oil is not usually in the best or the most attractive locations, nor in habitable ones, but rather is often in very inclement areas. For example, El Jobo: El Jobo is nothing that could be termed a paradise.

Humberto Calderon Berti: Well, there will be an open town there, an open community (in the camp), consisting of about 2,000 persons, who are those directly involved in the operational management of the plants. But all the personnel, that is to say, those not directly related to the latter, such as plant workers, maintenance technicians, etc., who are involved in the operation, will be living, some in Puerto Ordaz and others in Temblador.

2909
CSO: 3010/1315

## MENEVEN GUANIPA 100 PROJECT REVIEWED

Caracas RESUMEN in Spanish 3 May 81 pp 47-48

[Article by Juan Chacin Guzman: "The MENEVEN Guanipa 100 Project"]

[Text] This project, one of the two specific production projects established for the Belt by Venezuelan Petroleum, calls for the production of 100,000 barrels per day of heavy and extraheavy oil from the bloc assigned to MENEVEN until the year 1988 (see map). This new product to be generated will be diluted with medium crude at the rate of one barrel of medium crude to one barrel of heavy crude, so as to send to the Puerto la Cruz refinery and the loading ports a modified crude of about 17° API, which is a very acceptable heaviness from a commercial standpoint.

### I. Planning of the Project

In order to carry out the planning of the various aspects of the project, over a year ago a Guanipa 100 Project Management was set up, under the direction of petroleum engineer Benito Luongo, who reports to the MENEVEN Board of Directors through the company's production director. The most important strategies that were identified are described as follows:

1. The oil to be used as a thinner will come from the oil fields adjoining those for heavy oil.

2. For the project, optimal use will be made of the facilities and human resources that exist in the San Tome District.

3. MENEVEN will use, in a rational manner, any technical assistance from native or foreign agencies that may prove necessary.

4. A modular team will be formed to carry out the project, and will grow as the project grows.

5. Emphasis will be placed on the use of native goods, equipment and services.

6. At all times there will be a tendency to perform the activities associated with the project in complete harmony with the environment, respecting the agricultural and livestock activities that exist in the area.

## II. Components of the Guanipa 100 Project

This project consists of many activities related to the different functions involving exploration, drilling, production, urban development, roads and environmental matters.

### Exploration

Exploration has been conducted in this area since 1929. Some 5,000 kilometers of seismographic lines have been surveyed, and several dozen wildcat wells have been drilled. The future exploration program includes the review and evaluation of all the existing information, and also:

The reprocessing and interpretation of about 3,000 kilometers of old seismographic lines;

The implementation of about 5,500 kilometers of new seismographic lines;

The drilling of about 300 wildcat wells to determine the areas with greater concentration of hydrocarbons, and thus to proceed with the development of a new production potential.

### Drilling

If we estimate an average production of 100-150 barrels per day per well, the Guanipa 100 Project will require the drilling of 1,300-1,800 wells during the period, in order to generate the desired production potential of 100,000 barrels per day, and to counteract the natural decline in that potential. This large number of wells will demand excellent planning with regard to the design of drilling modules, drilling equipment more suited for this large volume of operations and the programing of the best methods for completing those wells, so as to guarantee maximum oil recovery per well dril'ed.

### Production

Similarly, it will be necessary to build over 100 new heavy crude production stations like the 70 existing stations now handling this type of crude. The treatment of this crude will include the most advanced processes for dehydration, salt water disposal and control of the possible toxic gases that may be found.

The preferred production method will be the artificial lift with a base pump, series of steel bars and rocker arm, a combination widely used in the production from heavy oil wells throughout the country. With the passage of time, it will be necessary to reinforce this artificial lift method with secondary recovery systems, especially steam injection.

### Urban Development and Roads

The Guanipa 100 Project will require an electric power supply estimated at some 45 MW. The additional personnel to be used on the project will need new housing, offices and community services. However, MENEVEN is aware that the expansion of these facilities must not be carried out under the old method of the oil camp, but rather that there must be a progressive integration with the open communities already in existence.

Insofar as roads are concerned, MENEVEN has about 700 kilometers of paved roads, and nearly 3,000 kilometers of gravel surface roads in the area. The Guanipa 100 development will require a paved main road from San Tome to the future development zones.

## Environmental Matters

The project includes, as a vital component, the study of the area's overall development. The oil production plans must fit into a broader program to develop the area's natural resources, considering the needs of the agricultural-livestock communities and the national requirements in their broadest sense. For this purpose, the Territoral Regulation Master Plan will be implemented, with the participation of INTEVEP [Venezuelan Institute of Petroleum Technology] and such agencies as the Ministry of Environment and Renewable Natural Resources (MARNR). MENEVEN is aware of the risks to the environment inherent in its activity, and will take all the necessary precautions to prevent undue damage to the environment. In this task, it will be assisted by such agencies as FUSAGRI, with which we have contracted for an initial agricultural and livestock diagnostic study of the entire area. In order to carry out this activity, MENEVEN has created its own environmental control organization.

## III. Personnel and Investments

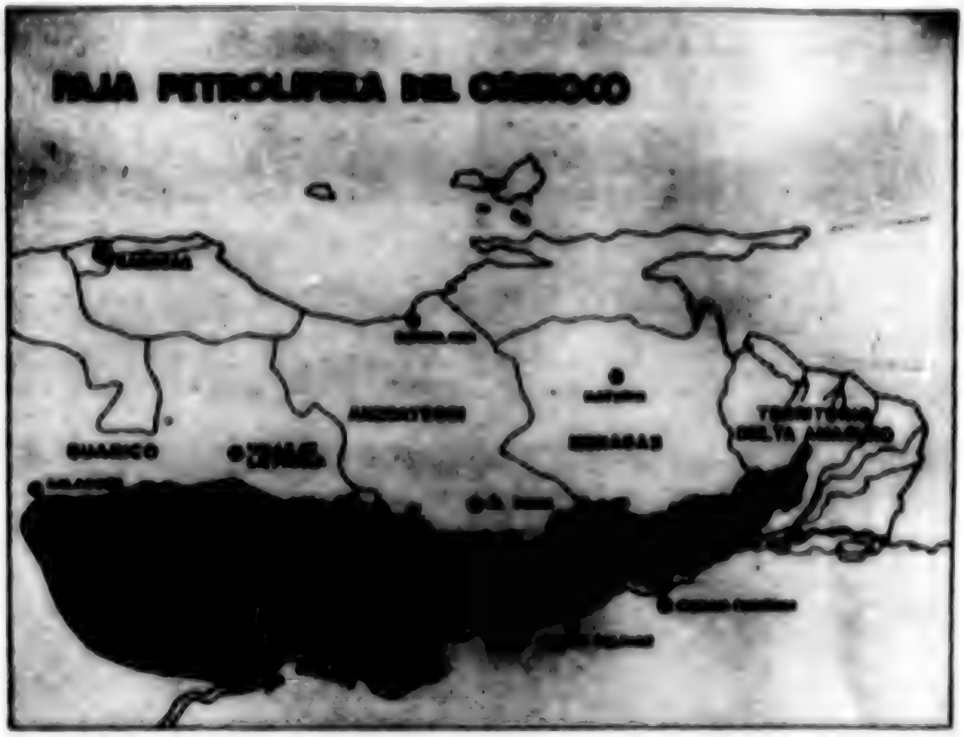
A preliminary analysis of the human resources that will be required for the development of Guanipa 100 over the next few years includes about 200 professionals, 100 technicians and between 600 and 700 employees; in other words, between 900 and 1,000 persons. Of this number about 240 are already working on the project. The investments required during the next 10 years (1978-1988) to carry out the project are estimated as follows:

| | Millions of Bolivares |
|---|---|
| Exploration | 800 |
| Production | 4,100 |
| Services | 750 |
| Total: | 5,650 |

These estimates are based on a production potential per well of some 100 barrels per day, and do not include the inflationary effect (1980 bolivares), nor the costs of studies and planning (approximately 10 percent of the total sum).

## IV. Conclusions

By 1988, MENEVEN will develop a production of 100,000 barrels per day of heavy crude from the Orinoco Belt area, for which it has been given responsibility by the national executive branch. In order to attain this fundamental goal, it has set up its internal organization, has identified the tasks that will be necessary and has the required technology and financing. Relying on its long experience in the area, and in the handling of this crude, MENEVEN will not have any significant technical problems in achieving the goal that has been assigned to it.



Orinoco Oil Belt

2909
CSO: 3010/1316

## MARAVEN, CORPOVEN ROLE IN ORINOCO SURVEYED

Caracas RESUMEN in Spanish 3 May 81 pp 44-46

[Text] MARAVEN in the Belt

### The Geographical Aspect

MARAVEN, like the other subsidiaries of Venezuelan Petroleum, has been assigned its share of responsibility by the main offices, with the approval of the Ministry of Energy and Mines, for the evaluation of the energy potential of the Orinoco Oil Belt.

The area of that assignment covers 14,500 square kilometers, broken down into 40 percent on land of the state of Guarico and 60 percent in the state of Anzoategui. Included within this area are the settlements of Santa Maria de Ipire, El Socorro and Pariaguan in the north; and, toward the south and center, the main settlements are Zaraza, San Diego de Cabrutica and the port of Mapire, on the left bank of the Orinoco River. The estimated population of this area is about 30,000 persons.

The construction work undertaken to date, which will benefit both MARAVEN and the residents of the area, includes: 150 kilometers of new penetration routes, together with the improvement of 120 kilometers of existing roads. At present, five bridges over rivers and seven reinforced paved fords for the passage of creeks are under construction; and 250 kilometers of access roads are also being built, while 120 kilometers of main roads are being improved.

### The Technical Aspect

The technical objectives may be summarized as follows: general exploration of the area; evaluation of the accumulations of existing hydrocarbons; evaluation of the supplies of other energy and surface water resources; and evaluation of the feasibility of developing and exploiting the oil deposits that are found. In order to implement the foregoing, between 1980 and 1982 a total of 200 wells will be drilled, and 4,270 kilometers of seismic lines will be surveyed. The cost of this activity is estimated at 941 million bolivares.

### The Preliminary Results

The work performed to date indicates that, over an area of about 1,000 square kilometers, included between San Diego and Zuata, the evaluative drilling has established wells with a production potential ranging between 20 and 200 barrels of oil per day in oil sand development exceeding 61 meters, with crude having a heaviness of 10° API.

In the northern area of the state of Anzoategui, about 20 kilometers south of Pariaguan, over an area far smaller than the foregoing, the wells that have been drilled showed a lesser development of oil sand, but the crude that was found has a heaviness ranging between 15° and 20° API. Shallow sources of fresh water were also discovered in 18 wells, with an average thickness of 128 feet; gas was found in 12 wells with an average thickness of 13 feet; and the presence of coal was discovered in isolated strata with an average thickness of from 2 to 4 feet, without commercial value.

## The Human Resources

The MARAVEN personnel directly associated with the Belt total 75 persons, located in the main office and the area of operations; whereas the hired personnel number 177, located chiefly in the operational area. It is estimated that, by 1982, these totals will reach 140 and 290, respectively.

## The Environmental Conservation

In the realm of environmental conservation, studies are also being made and the compilation of data is being started. Included among the studies and measures of a general nature are: diagnosis of the basins of the rivers, and scaled plan for reforestation of the basins; diagnosis of the erosion on the savannah banks, and plan to curb the progress of the erosion; reforestation of the road system, and areas with wells and installations; treatment plants for waste from urban centers, and construction plan for sanitary refill to dispose of the garbage therein. Insofar as agricultural activity is concerned, it is intended to set up a plan similar to those carried out by the Farmer's Service Foundation in other areas where MARAVEN operates.

## The Regional Development Strategy

The phases to be completed for the regional economic development plan are as follows: determination of objectives; evaluation of resources; conversion of objectives into programs; selection of programs based on the resources; coordination; implementation and execution; administration and maintenance.

## The Land Problem

The evaluative phase is of a preliminary nature, and the goal is to reduce to the minimal level possible the effects of the operations on those occupying the land and the environment in general. Therefore, for the time being no easement or other liens with prolonged effects in time on the land have been established; and, on the other hand, sites and accesses are being negotiated, acknowledging compensatory payment for any damage caused in the area affected, based on rates agreed upon with the occupants of the land.

Emphasis has been placed on the need to abide to the maximum extent by sound operational practices, so as to reduce to the minimal degree possible the impact on the environment; and, in this connection, and among other measures, the study of the environmental impact, which is basic to the master plan for the area's environment, is being carried out on a priority basis. Campaigns are being conducted to raise the consciousness of the personnel themselves, and of contractors. The area to be affected by sites and accesses has been reduced to the minimal size that would be viable; as are the number of locations for extracting materials to prepare the aforementioned works. The sites have been reforested with dry wells, and special care has been taken not to damage rivers and tracts of land covered with mirity palms.

## Conclusion

The recent activity in the Orinoco Oil Belt will cause an extensive sector of the company to become progressively engaged in its tasks, for the purpose of obtaining a more complete evaluation, and establishing the informational base so that the future phases may be carried out on reliable grounds, calling for the total development of the area and environmental conservation, coexisting with the oil activity.

MARAVEN has had vast experience in the exploitation of heavy crude, wherein it was a forerunner on a worldwide scale, and still retains leadership. It has had longstanding experience in agricultural development, and also holds a forerunner position in the oil industry with respect to environmental protection, a valuable experience for the future programs to develop the Orinoco Oil Belt.

## Phases for a Regional Economic Development Plan

1. Determination of objectives
2. Evaluation of resources
3. Conversion of objectives into programs or action
4. Selection of programs based on the resources
5. Coordination
6. Implementation/execution
7. Administration/maintenance

## Environmental Protection Plan for the Orinoco Oil Belt (FPO)-MARAVEN Area

### Studies/Measures of a General Nature

1. Diagnosis of the basins of the rivers and scaled plan for reforestation of the basins
2. Diagnosis of the erosion on the savannah banks, and plan to curb the progress of the erosion
3. Reforestation of the road system, and areas with wells and installations
4. Sewage treatment plan for urban centers
5. Construction plan for sanitary refill to dispose of the garbage in the urban centers

### MARAVEN-Zuata Area

Area: 14,500 square kilometers
Location: 40 % in state of Guarico; 60% in state of Anzoategui
Towns within the area or near it:
(North) Santa Maria de Ipire-El Socorro-Pariaguan
(South and Center) San Diego de Cabrutica-Mapire
(Population) ± 30,000 inhabitants, mostly in the north

Roads-Improvements Made

1980: new penetration routes: 150 km
improvements on existing routes: 120 km

1981: Construction (program): 250 km (access routes)
main roads: 120 km (improvements)

Construction: 5 bridges, 7 reinforced paved fords (washing of creeks)

Objective: to benefit MARAVEN operations and local farmers and livestock raisers.

What Is CORPOVEN Doing?

The president of this operating company, Dr Franck Alcock, responds to a questionnaire from RESUMEN:

RESUMEN: What importance does CORPOVEN attach to the Orinoco Oil Belt?

Alcock: In CORPOVEN, as in the entire national oil industry, we regard the Orinoco Oil Belt as a priority investigation project, the fundamental purposes of which are to establish the actual volume of oil stocks in a area covering nearly 54,000 square kilometers, and the features of the crude, and the most efficient and economic extraction methods, all as part of a policy aimed at insuring for the country the continuity of a sound oil industry that will enable it to accrue the funds necessary for consolidating its development.

RESUMEN: Which is the area in the Orinoco Oil Belt assigned to CORPOVEN?

Alcock: CORPOVEN has been assigned responsibility for making an exploratory evaluation in the easternmost area of the Belt, on territory of the state of Guarico, over an area of 23,610 square kilometers.

RESUMEN: What is the task that has been assigned to CORPOVEN in the Belt?

Alcock: The goal of the exploratory program in this area, known as "Machete," is to determine the stratigraphy, the regional structure, in the subsoil, and to obtain other items of information of geological importance, with a view toward determining the commercial accumulations of hydrocarbons. In order to attain these goals, it is essential to carry out seismographic surveys to define the configuration of the subsoil and, in this way, be able to discover "traps" or structures in which there may possibly be accumulations of hydrocarbons.

RESUMEN: What work has been done to date?

Alcock: In an area where, prior to the exploratory program undertaken by CORPOVEN, about 21 wildcat wells had been drilled, our company has surveyed some 6,000 kilometers of seismic lines, with an investment of 70 million bolivares, as part of a plan to drill 128 wildcat wells. The execution of this plan started in 1980, with a program to drill 28 wells in the southern part of Valle de la Pascua, in the Espino area and in Las Mercedes, and to survey 2,200 kilometers of seismic lines.

After about 24 wells had been drilled, the presence of heavy oil and some gas reserves was discovered.

RESUMEN: In its work in the Belt, does CORPOVEN require assistance and technology from specialized firms?

Alcock: During the current phase of exploratory evaluation that our company is carrying out in the Belt, it is not necessary to resort to specialized sources of technology to perform its work. However, we are heedful of, and in close contact with the research and development center, INTEVEP [Venezuelan Institute of Petroleum Technology], so as to be ready and able to undertake production tasks when this is required of us by the main offices and the country's best interests.

RESUMEN: What technology will CORPOVEN use to extract the crude that exists in the Belt?

Alcock: Our experience with extraheavy crude is not new. Campo Boscan, operated by us in the state of Zulia, produces heavy oil the features of which may very well be compared with those in the Belt. In addition, the company operates heavy crude fields on the northern strip of the Belt, as in the case of Melones, where a reevaluation of an experimental combustion project is under way in situ, which is of great importance from the standpoint of investigating the Belt. The experience gained in these deposits would be of great benefit to us in any exploitation initiative that we might have to undertake in Guarico. Other subsidiary operating firms can also contribute valuable experience. We must remember that both LAGOVEN and MENEVEN have individual responsibilities for extracting, in their respective areas of the Belt in Cerro Negro and Hamaca, as part of their DSMA [South Anzoategui and Monagas Development] and Guanipa 100 projects, 125,000 barrels per day of improved crude and 100,000 barrels per day of heavy crude, over the next 10 years. All of this, added to the technological backing that we may receive from countries with a tradition of exploiting extraheavy oil, will facilitate the other work that our company would have upon being assigned production responsibilities in the Belt.

RESUMEN: How will CORPOVEN insure the protection of the environment in the area of operations in the Belt?

Alcock: The protection of the environemnt is one of the prime objectives taken into account in our exploratory activities in the Belt, as it is in any others carried out in our operational areas. In Guarico, we have been especially careful in selecting the most appropriate areas for building roads, in order to prevent damage to the high vegetation and gallery woods which, generally speaking, constitute reservoirs of animal and plant species. The highways are diverted when necessary, to protect the headlands in areas planted with mirity palms, and a reforestation program is under way in the areas in which we are engaged in activities. Instructions have been devised for the construction of adequate drains to prevent pollution from solid and liquid waste where the exploratory drill is operating; and, after the drilling, the "bailing out" and sealing are done. In these locations also, after the exploratory activity, programs for forestation and cleaning up of the site are carried out.

RESUMEN: How will the CORPOVEN operations affect aspects related to the territorial regulation of your area of exploration in the Belt?

Alcock: We are following very closely the study on territorial regulation of the Belt area undertaken by the Ministry of Environment and Renewable Natural Resources, [MARNR], with the cooperation of PDVSA [Venezuelan Petroleum, Inc]. At the present time, PDVSA and MARNR are discussing the determination of responsibilities on an accelerated basis. It is incumbent on us to participate actively in the oil-related aspects thereof, and in any other activity delegated to us by the project management. The results of these studies will help us to establish guidelines in this regard, because they will serve as a direct plan for the development of the region; which will afford a rational utilization of the natural resources and a better quality of life and welfare for the people. As for the impact that our activities could have on the Belt, I can explain to you that the personnel working at present in the area are integrated into the communities near the area of operation. And as our work progresses, if the circumstances should impose greater demands for human contingents, the latter would be completely integrated into the towns located in adjoining areas. This means that we have given up the idea of building camps, such as those built in the past in the industry's traditional operational areas.

RESUMEN: What additional contributions has CORPOVEN made in the Belt area for which it is responsible?

Alcock: It is fitting to stress CORPOVEN's contribution to the construction of the infrastructure required for its operations in the state of Guarico. In 1980, 183 kilometers of highways and 268 meters of bridges were built, with an investment exceeding 35 million bolivares. In 1981, the highway construction will be intensified, adding 360 more kilometers to the state's road system, and 40 kilometers of highways will be improved. This in itself constitutes a sizable contribution from CORPOVEN to the area's road system.

Our contribution to the Guarico community is also considerable, with the cooperation that we have given to overhauling the Valle de la Pascua airport, and with the forthcoming provision to the San Juan de los Morros airport of the equipment and facilities needed to supply fuel to the aircraft operating there.

All this goes to show that, although our main responsibility is to perform the exploratory work in the Belt that Venezuelan Petroleum has assigned to us in the state of Guarica, we are also interested in lending our support to contribute to the area's harmonious development.

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## LAGOVEN CHIEF DISCUSSES LUMMUS CONTRACT

Caracas RESUMEN in Spanish 3 May 81 pp 50-58

[Interview with LAGOVEN President Guillermo Rodriguez Eraso; date and place not given]

[Excerpts] Rodriguez Eraso's offices in LAGOVEN (formerly Creole) are unpretentious. The furniture shows that it has not been changed, but it is impeccably clean. Everything has been well preserved: the elevators, the bronze lamps ("it reminds me of the ship 'Guadalupe'," a visitor commented). LAGOVEN is the largest of the four companies into which the former concessionaires have been "compressed." It is the heir of the former Creole company, and has assimilated other small concessionaires: Philips, Chevron, etc. It is also the most advanced, in all respects, of the firms operating in the so-called "Orinoco Oil Belt." It recently progressed to a decisive phase by granting to the Lummus Engineering company the "bidding award" for the work on the coordination and planning of what is known as a "megaproject," even in terms of worldwide dimensions. The first and most obvious question that we ask Rodriguez Eraso is: Why is LAGOVEN the most advanced insofar as the exploration and development of the crude in the Belt are concerned?

### The Contract With Lummus

[Question] A few days ago, it was announced that LAGOVEN had granted, had approved a contract for the Lummus company, which is a North American engineering firm. This was the culmination of a somewhat turbulent process, from the standpoint that some not very accurate comments were made and rumors were circulated about the size of the contract, the lack of nationalism represented by hiring foreign engineering when it could be done here, etc. Many of these things have been quite satisfactorily explained, and it is obvious that in some instances there was misunderstanding or lack of information, and in others, a little malice. But, in any event, we ask Rodriguez Eraso to explain to us, first, what that famous contract with Lummus involves, and, second, how and why it was given to Lummus, and whether this was the result of a bidding, a comparison of proposals. In other words, what was the administrative procedure for this? Thirdly, we ask him to explain to us the amount of that contract in bolivares or dollars; and, fourthly, what is its significance?

[Answer] This famous adjudication contract which culminated in the "bidding award" that was granted to the Lummus company related to the first project for the commercial development of the Orinoco Oil Belt which, as we mentioned previously, was made incumbent on LAGOVEN because the area which is a priority one, and the most promising within the Belt, namely, the Cerro Negro area, is located within the block that was assigned to LAGOVEN. In 1928, for the first time, there appeared in the ministry's guidelines for Venezuelan Petroleum, as executors of its policy, the stipulation that steps were to be taken in the Orinoco Oil Belt in order to be in a position to produce 125,000 barrels per day.

[Question] As a goal?

[Answer] As a goal for the mid-1980's. The interesting thing is the origin of this entire project for Monagas and Anzoategui development, which we now call the DSMA [South Anzoategui and Monagas Development ] project. That stemmed from an instruction, a very clearcut and very definitive guideline from Venezuelan Petroleum's stockholder, that is, the Ministry of Energy and Mines, as spokesman for the national government and as spokesman for all Venezuelans, who are the owners of this industry. It was up to us to carry out this project. In addition to the fact that we already had a series of previous studies of this entire area, we have become fully involved in carrying out this project. It is a project which, owing to its nature (where it is situated and where that oil may emerge), is a project with several facets. First, you must find out where you are going to do the work, drill the wells and set up all the installations for it. Then, in that first mention, it was also said to involve improved crude (it was not to produce 125,000 barrels per day from what emerges on the surface, rather, you had to convert it into something more usable, and more profitable, as we have said). So, they were telling me what was wanted; and then, of course, it had to be transported to a port of loading in order to be able to sell it to the export markets. With that in mind, we set forth. How did we set forth? In the first place, we appointed a group of our people; we took them away from their normal duties and assigned them to make the preparatory and preliminary studies, so as to determine to some extent what we had in mind. This is the phase that we call "preplanning;" in other words, defining what must be studied in an orderly fashion. We made that "preplanning" study internally, with all the LAGOVEN personnel, people selected from various locations; and it was a rather well qualified group which I don't think entailed the departure of more than 15 or 20 professionals at any time. In other words, it was an ad hoc group.

Once we arrived at a definition of what should be studied in depth, in order to consider what a project of that kind might resemble, we realized that we had to seek aid, because this was too much for us. Therefore, we contacted a group of qualified companies which we though suitable owing to their experience, their capacity for analysis, and their capacity for studying projects of this kind. We opened private bidding for this, and made our choice from it after a careful analysis of all the proposals that we received. I think that, at the time, we picked out about 12 companies, and finally selected one. That company was Bechtel, which was our consultting firm, along with other companies.

That was in mid-1979. Bechtel joined us in the manner in which we are by now used to working with firms of that type, wherein we again created an ad hoc committee. And that committee has a management, which can consist only of our people, from LAGOVEN, because they are the ones who bear the responsibility.

Then, in the area of the working groups, the group that will study the refining problems (for example, the improvement of crude), it may be that the head of that group is someone from Bechtel, and there would be five more engineers, of whom four are ours and one is Bechtel's. Or it may be that, in the group that is going to study, let's say, the problems of the water-bearing areas, the head would be a Venezuelan geologist employed by us, with two gringos and three Venezuelans in addition. In other words, there is a complete integration of personnel from the two firms to reach a goal, and all this is managed by our people, who are the only ones that can bear the responsibility. This planning group was assigned, as a goal and a mission, that they must produce two basic things for us: a master plan for execution, and then a budget estimate. Having started in mid-1979, that group must finish its work by the end of 1981 or the beginning of 1982, consisting of studies to define projects and for planning. For this, we shall use over 1.2 million man-hours of work, engineering and professional-technical work. Associated with that 1.2 million man-hours of work, we think that the total cost of this planning study for the project will amount to about 300-350 million bolivares, just to study how one is going to do things. We know that there is oil. We do not know the exact amounts. But we are sure that, in any event, we shall extract the 125,000 barrels per day there.

So, in this regard we do not have any fear. We think that, between now and the end of the year, we shall complete the 1.2 million man-hours, 50 percent of which is being provided in the country, with what we are doing at LAGOVEN, with our own people, what we are doing through Venezuelan consultants of all types, from the people who are studying the water-bearing areas to those who are making the ecological studies and the cartography infrastructure: this entire range of things that must be studied. So, we have half done in the country, and the other half done through the facilities of our main adviser, which is Bechtel, in this planning phase. Hence, we are first acquiring a large amount of information of our own, because the LAGOVEN personnel who have been working on this project since 1978 have been "sharpened" in this type of study.

There, they analyze such things as: what are the parameters involved? and what approaches must be taken? They work side by side with the greatest engineering company in the world, namely, Bechtel, which has made 50 studies of this type in all parts of the world.

That is on the one hand. Then we have the national consultants, who are producing studies for this management of the project, with clear, very specific and extremely stringent specifications for quality and, in particular, time: "an answer to this problem by such and such a date," and "how many man-hours are needed, and how much does this cost?"

[Question] Who are those national consultants?

[Answer] On the project management level, we have the firm known as Integrated Technical Consultants (STI), which is headed by Dr Arnoldo Galbaldon, and which has a large group of professionals working for this firm.

[Question] Arnoldo Gabaldon Jr, the engineer?

[Answer] The engineer. Those are our main advisers on that level. Now there are several consultants; there are individual companies. We have contracted with national universities, such as Oriente University and Simon Bolivar University. We have contracted with a group of institutes: IVIC [Venezuelan Institute of Scientific Research], and INTEVEP [Venezuelan Institute of Petroleum Technology] (our sister company). We have assigned it several jobs that are being done for us with national universities and also official groups, such as the Ministry of Environment, for example, in the ecological area and the area of environmental classification, which have been of great help to us. We have assigned the studies on soil and agricultural capacity in particular to the people in the Oriente University School of Agronomy, who are doing that work for us. The entire study of the socioeconomic impact has been done by the group at Simon Bolivar University. Hence, there is a group which I daresay exceeds hundreds of Venezuelan professionals, many of whom had never worked for the oil industry, but who are working for it precisely because of the great size and scope of this project.

[Question] We have not yet arrived at the Lummus contract.

[Answer] No, I am talking about the background. Now we come to the middle of 1980. We began to realize that all these studies that we were making on planning and different aspects of the project had led us to the conclusion that, if we wanted to have 125,000 barrels per day of improved crude, we had to start doing certain things a little faster than we had been, and we had to arrive at what we term in the contract a certain amount of "overlapping" of phases.

That is common in a house. They plan the bathrooms for the house, but the foundations have already been planned, and if the permit is obtained from engineering, they start building the foundations while the engineer is still at his drafting table; and then the house is ready at least 2 months early. It is more or less the same thing, but bearing in mind the differences.

So, we obtained agreement from our main offices that we should start contracting for the construction phase, and begin acting in that direction during 1981, so that when the phase for defining the project was finished, at the end of 1981, the actual execution thereof would be somewhat advanced. Based on this, we opened another international bidding for the firms that were considered qualified, wherein we invited 18 firms, including American, British, French, Italian and Japanese companies. First, those firms were sent a questionnaire in which they were asked about their interest in, and capacity for selecting a contract of this type, for competing. In the first of exchange of those first 18 that we invited, six said that they were not interested. Then we were actually left with 12. One of them arrived late, so that, of the 18, we were left with 11. Next, we began to "grade" these 11, to ascertain which had the capacity, based on the answers that they gave to the questionnaire which was sent. This was done by an evaluation group which worked fulltime, without doing anything else, on the examination of those bids, in order to arrive at a selection.

This group responsible for that task consisted of 23 professionals, including engineers, economists, accountants, auditors, lawyers, specialists in personnel and human relations matters, and specialists in finance; so that all the various possible angles for analyzing the bids could be considered. The bids were analyzed, and the different companies were visited. In these instances, their technical capacity was gaged, then an analysis was made of their managerial capacity; in other words, the people that each firm had at all times to assign to a project. And those people had to be visited and interviewed personally. Is Mr So-and-So, whom the company considered sending to Venezuela by mid-1981, managing a project in Alaska?

Then they bring that gentleman to you, or you go to New York to see him; and that gentleman talks with you, and you converse and meet his wife, you find out where he worked, and what his hobbies are. It involves that much detail! That is because it is a major project. Of course, there are later the commercial terms; that is, how much does that gentleman charge for his services? This analysis process ended in mid-February; in other words, we worked for 5 months, and I can tell you that the study group's recommendation went first to the level that it should have gone to: namely, the contract group, to study the contract for the project itself, the project management itself. The recommendation which left the study group was backed by that group, going from there to the next echelon. Then it went to LAGOVEN. We at LAGOVEN have a committee called the Central Contracts Committee, chaired by the company's finance manager, which is assisted by a group of functional managers from the company.

This recommendation was analyzed there, and backed by the Central Finance Committee. Next, it was submitted to the LAGOVEN Board of Directors. We had all the documentation, we spent over a day analyzing all the details of these complex and exhaustive evaluations. We too were in agreement with the recommendation that had come from below. Once it was approved by the LAGOVEN Board of Directors, it then went to our main offices. The main offices' board was given all the data, and also backed this recommendation. Next it went to the final place where all such things do, namely, the National Contracting Commission of the Oil Industry, headed by the Venezuelan Petroleum legal consultant, in which there are present, as members, several board members of Venezuelan Petroleum and all the presidents of the subsidiaries. There, an analysis was made of the entire process, the process was analyzed "as a process," through all the steps that have been taken, how the evaluations were made, how the studies were carried out, and how the bidding began; in other words, the process in all its details, in order to assure us of clarity.

So, we arrived at Lummus. I can tell you that, of the 18 companies, it was reduced to this; and all we had left were five, the bottom line. Those five included Lummus, Bechtel, Fluor (which were the three American firms); there was a British firm, Dawy, and a French firm, Technid, the latter two being European. In early February, we notified them, so that they would not continue to waste their time making more studies, since they did not have a chance. Later,the final three were on the bottom line, so to speak, until the specific recommendation came from the study group. I am greatly pleased that in a project and a contract of this kind, and of this scope, it was possible to maintain the confidentiality of the decision until the time, when I was at Amuay (because I was not even in Caracas), we made the decision to notify the beneficiary, the winner of the bidding competition. They were completely surprised, because they had no idea, and when we called, immediately, 5 minutes later, the other two that had been with them until the end, also on the bottom line, they too were surprised (unpleasantly surprised); therefore, this was kept in absolute secrecy. Later, two of the presidents of those firms told me:"Dr Rodriguez, frankly, we have seldom dealt with a group having the competence, technical integrity, confidentiality, discretion and professionalism of the group that you sent to make the evaluation in this instance. We did not win, but we are proud to have participated in a sincere action. We congratulate you." So, that has brought me great satisfaction.

The 'What' and the 'How Much'

[Question] Now we are quite clear on the how and when; let us move to the what. What are these people going to do?

[Answer] That is something which must be very clearly explained, because what they are going to do is innovative. In the first place, the size of the job that is going to be executed, if you measure the work from the first well that is drilled, the pipes, the pumps, the entire "hardware," then the plant, which is a refinery, an "improvement plant;" plus the piping to reach loading port X (we do not yet know where it will be) and the loading port itself; and furthermore, unfortunately, that is not in paradise here.

That is located in the middle of the savannah in south Monagas, where there is nothing but the people of Temblador, who will have to be assisted greatly, so that there may be an orderly development. And we shall have to provide an infrastructure for the people who will have to live near that area, and who must be supplied with services. Totaling all these items in bolivares, starting in 1981, they will amount to between 20 and 30 million bolivares, at the 1981 fixed price of bolivares.

We are talking about 7 years. People imagine, "Well, they are giving a gentleman a patent, a permit here; a contract has been signed for the work to be carried out for this." That is not the case!

The case is totally different. From the beginning (and this was very clear in the guidelines from the ministry), we realized that the Belt would provide an extremely valuable element, so that there could truly be developed around it a genuine structure of native services to the oil industry. Why? Because the Belt revealed and continues to reveal a situation of constant work, and a series of projects which will take place, one after the other, over the next 25 or 30 years. So, it is not that you are going to have a camp at Lake Maracaibo, because you will have 50 wells and there it is, you have finished; but rather that you have ahead of you the development of an immense project, and you have 2 or 3 decades ahead of you. So, you must equip yourself in a way different from that for the temporary, sporadic, spasmodic work that the oil industry often has, with peak employment and later unemployment.

The Belt will be different. Thus, it was realized that this could be the element needed for the "intensification of nationalization," the expansion of the oil industry, and the spreading of oil, by rendering services to oil, and not spreading it on "other things" which have never been productive thus far. In other words, to be truly an oil country, an oil country in the full sense of the word. Returning to Lummus, it will not construct; Lummus will be a "coordinator," and that is what it is called, a "general coordinator," "of execution," according to the terms of its contract, which is a contract based on services received.

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